

# THE IRON AGE

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## Home Modernization—A Way Out for the Construction Industry

**C**ONSTRUCTION is so far reaching in its effects that all efforts to stimulate it are of interest to the business world. The main purpose of the Hoover conferences, following the stock market crash, was to set in motion a maximum amount of both public and private work. Public utilities and large industrial organizations were appealed to particularly, since many of those companies have long-range programs that are planned without regard to temporary fluctuations in trade.

The railroads and other utilities responded in a way that exceeded expectations. Capital expenditures of Class 1 railroads for new equipment and additions and betterments totaled \$223,772,000 in the first quarter, or \$11,772,000 in excess of the estimate submitted to President Hoover's conference in December, and \$96,653,000 above the outlay for the first three months of 1929.

### Residential Building One-Third of Normal

These improvements were, and could be, undertaken because they were needed and the carriers were financially able to carry them out. No mere exhortation to "build now" is sufficient in a period of depression. This has become especially clear in connection with residential building. Easier credit has proved of no avail in reviving home construction, in the face of evidences of overbuilding in many parts of the country and an increase in real estate foreclosures and tax sales.

Normally the value of residential construction is equal to that of all other forms of building combined. Recently it has been only one-third of its normal volume and about one-half as large as that for other kinds of construction.

With the door closed to an early increase in dwelling house construction, the outlook for manufacturers mainly dependent on that form of activity has been anything but bright. However, business recession puts men on their mettle as in no other periods. It is not surprising, therefore, that human ingenuity has found what seems to be a way out of this dilemma.

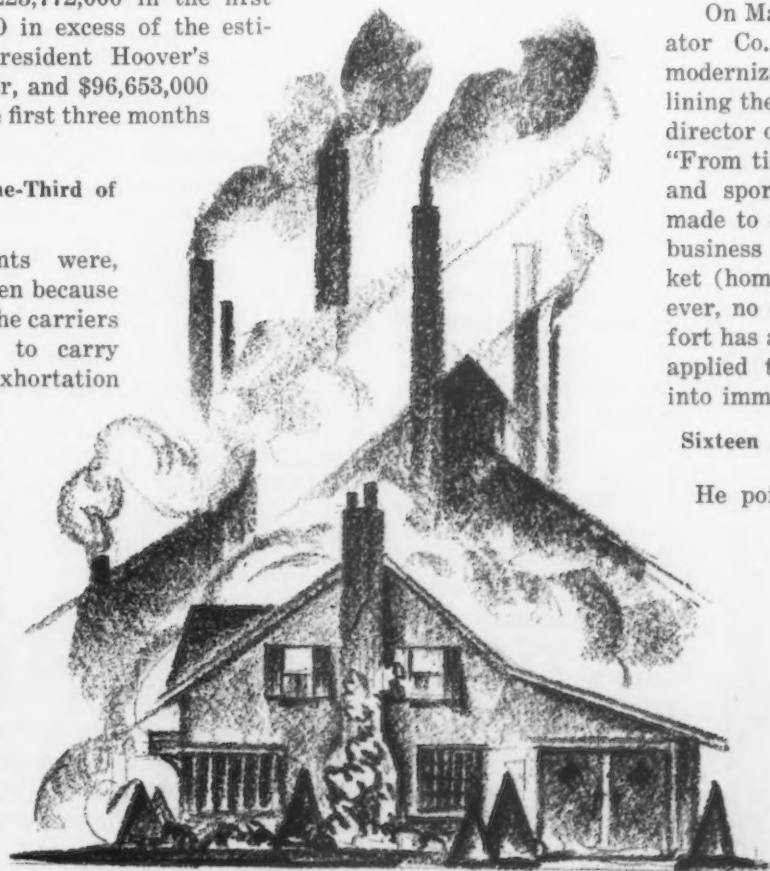
### Modernizing Campaign Started May 1

On May 1 the American Radiator Co. inaugurated a home modernization campaign. In outlining the program, A. R. Herske, director of sales promotion, said: "From time to time intermittent and sporadic efforts have been made to obtain our share of the business available in this market (home modernization). However, no consistent, intensive effort has as yet been continuously applied to convert this market into immediate sales dollars."

### Sixteen Million Homes Without Radiator Heat

He pointed out that there is no likelihood of a gain in home building or even a duplication of the 1929 volume. "That leaves," he concluded, "only the modernizing field in which to obtain an immediate increase in total dollar sales."

Census reports, the company found,



show that 16,000,000 homes in the United States are without radiator heat. If one out of a hundred were equipped with radiation, the total would be 160,000 homes. Estimating the average investment in materials as \$300, the expenditure for the 160,000 dwellings would be \$48,000,000. While the conversion of so high a percentage of homes to radiator heat this year is improbable, the American Radiator Co. management believes the sale of improvement projects in 1930 to one out of 500 of the 16,000,000 home owners is by no means an impossible task.

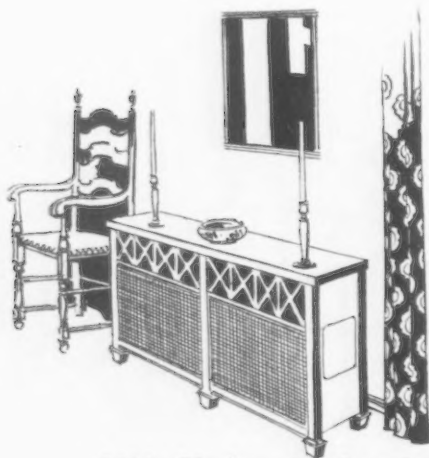
#### Will Call for More Labor and Materials

This plan, if successful, will represent a practical, resultful method of alleviating the current business depression. Suppliers of materials whose trade will be stimulated include manufacturers of pig iron, steel pipe, pipe fittings, steel sheets, cast iron soil pipe, lumber and, of course, the radiator company itself. Materials, it is estimated, will account for 30 per cent of the total cost of the job.

Employment will be increased, both among suppliers of equipment and materials and among those installing the work. Direct labor on the job, it is estimated, will represent 50 per cent of the total cost, while 20 per cent will be taken up by contingencies and profits. Needless to say, the work will help carry the overhead of jobbers, steamfitters and plumbers, besides swelling their earnings.

#### Complete Merchandising Campaign Prepared

It is one thing to conceive a plan and another thing to execute it. The American Radiator Co. has prepared complete merchandising plans, covering advertising and the canvassing and selling of prospects. Separate instructions have been prepared for the company's own branches, for jobbers and for plumbing and steamfitting contractors. All accessories of the merchandising campaign, including window displays,



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Large amount of materials and labor will be required if program succeeds.

Instalment selling, which many feared would accentuate business depression, is being used to ease the recession.

Entire cost of each improvement job will be financed by American Radiator & Standard Sanitary Corporation subsidiary.

Complete merchandising campaign prepared for company branches, jobbers and steamfitters.



No possible means of advancing the program has been overlooked. Even employees of the company's manufacturing plants are being called upon to help. As an inducement they will be given cash prizes for "tips" resulting in the sale of prospects.

Great emphasis has been placed on getting orders as soon as possible, so that some of the slack can be taken out of the company's dull season in manufacturing. It is interesting to note that the instrument that is counted on most to bring this about is the deferred payment plan—the very thing that had been expected to accentuate economic distress following the stock market debacle. Instalment payments as a means of alleviating depression—a new rôle for a plan still regarded by many as a threat to sound prosperity!

"The time payment method is a proved success," according to the American Radiator Co. "It has been used for years to sell more pianos, more vacuum cleaners, more washing machines, more furniture. It has even been a great success as a method of selling automobiles, which depreciate rapidly in value. . . .

"For many years real estate and homes have been sold on time payments. . . . Neither the real estate nor the building is subject to rapid depreciation in value. . . . Both heating equipment and plumbing fixtures are built in—that is, they become a fixed part of the house and they last for years. . . . Make it easy to buy! Sell heating on time payments."

#### Company Finances Entire Job

To finance instalment payment jobs the Heating & Plumbing Finance Corporation was organized. It is a subsidiary of the American Radiator & Standard Sanitary Corporation, and does not, therefore, aim to make profits.

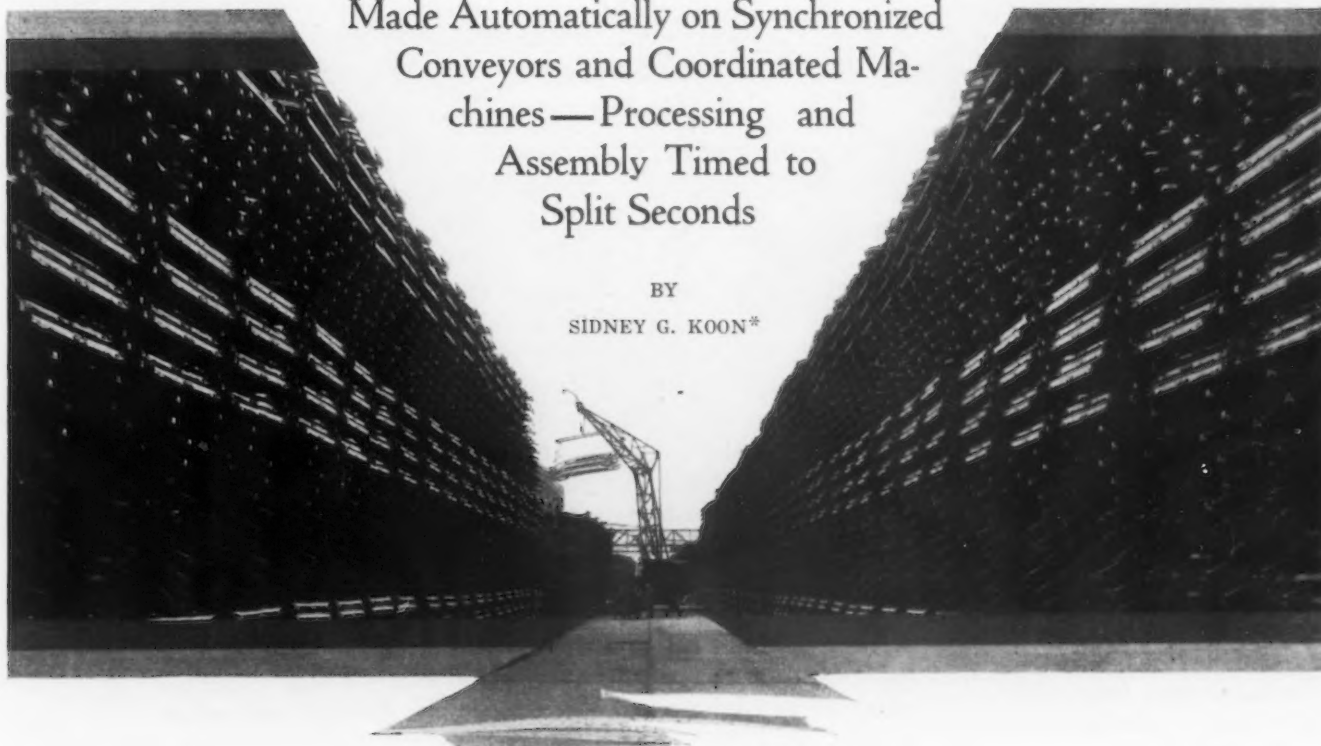
This company finances not merely the materials, but the entire cost of the job. The entire machinery of the instalment payments is handled by the finance corporation. As soon as work is completed, the steamfitting contractor receives his entire compensation. A small initial payment—a minimum of 10 per cent of the total cost of the job—is required of the home owner, but further payments are deferred until the fall when he begins using the equipment.

A 100-ton electrically operated testing machine has been installed by the College of Art and Technology, Leicester, England. Specimens 10 ft long can be stretched and wedge grips will take 3-in. pieces.

# 10,000 Automobile Frames a Day

Made Automatically on Synchronized  
Conveyors and Coordinated Ma-  
chines—Processing and  
Assembly Timed to  
Split Seconds

BY  
SIDNEY G. KOON\*



**Y**EARS ago, when I first saw an automatic wire-fence machine, with its processing parts moving with the precision of German soldiers on parade, I was much impressed with the possibilities and the potentialities of automatic machines. Each part handling one of the small sections of wire—vertical in the erected fence—took it from a coil as the cutter snipped it to proper length. The little pieces of wire were then swung around, put into position across the longitudinal wires and the ends quickly coiled around the longitudinals, thus forming the completed fence. All this, of course, was done while the longitudinals were moving slowly and uniformly through the machine.

Such equipment as that, however, presenting merely a few moving parts in a single machine, suffers at once by contrast with a massive group of machines in several production units, such as are employed in the automatic frame plant of the A. O. Smith Corporation, Milwaukee. The impression one gathers after watching that plant at work, turning out its product at the rate of 450 automobile frames an hour, may perhaps be expressed by a statement made by the guide who showed me through the works.

He said that professors in mechanical engineering at universities within striking distance of Milwaukee are handling a psychological problem with their students in the following manner: As the seniors approach the end of the course—as, indeed, they see the finish a short distance ahead and believe that there is nothing more for them to learn—their bumptious-

ness is taken out of them by a visit to this plant.

In groups of a dozen, a score, or more, they are passed through the plant, where they see the array of automatic, synchronized machines in operation, many of them without a man anywhere near. And, with chastened spirit, they depart, with the idea that perhaps there may be something left to learn, after all.

Naturally, such a plant did not spring into existence over night. It represents the result of some years of development, from the time when the first automobile frame of pressed steel was made, in 1903. It was not, however, until 1920 that this plant was completed. And, of course, it has been subject to revision in much of the detail since that date. In fact, it is constantly being revised, within limitations, as improved methods of performing certain operations are developed.

## *Eight Manufacturing Units Employed*

**M**UCH of what follows is taken from a paper read at the Chicago meeting of the American Society of Mechanical Engineers, early in March, by A. W. Redlin, assistant works manager. *THE IRON AGE* published a brief description of this plant in the issue of March 22, 1928, page 794, in which several illustrations showed the main operating units. Other illustrations, from changed points of view, are those herewith.

While the plant has eight manufacturing units in operation, the four principal manufacturing processes, taking place in one large room, are the items

\*Associate Editor, *THE IRON AGE*, New York.

of especial interest. In the first of these, employing six large presses, the lengths of strip steel are cut, punched and finally formed as side-bars, rights and lefts alternately. In this press line the steel passing through the four operations is handled entirely by conveyors.

First the straight strip is "kicked up" edgewise for the contour of the side rail. Next the numerous rivet holes and other openings are pierced, the rights and lefts in separate presses. Then the blanking press trims the outlines of all the blanks, which then are fed into the two forming machines, right and left, for folding up the flanges into the conventional channel section. Every other blank goes into the first machine, the alternate blanks being automatically turned over before reaching the second machine—thus forming the rights and lefts.

In the second group of machines, Unit No. 5, these rights and lefts are fitted with the various spring hangers, brackets and other attachments which they are to carry in the completed frame. The ends are clipped off to close tolerances and certain additional holes are pierced—those which must come very close.

Meanwhile, in the four rows of Unit No. 4, the cross bars or transverse members are made and similarly fitted with their clips and other attachments. This again is entirely an automatic, timed operation. Unit No. 6 is the general assembly line, where the side bars and the transverse members are brought together and automatically riveted to each other, making the completed frame.

What is particularly impressive about the whole operation lies especially in the side-bar sub-assembly and in the final assembly of the entire frame (Units 5 and 6). Each of these two units is operated independently, but each within itself is a complete, coordinate whole, having all its movements synchronized definitely and with the utmost precision.

#### *Side-Bar Sub-Assembly in 19 Operations*

**O**PERATING stations in the side-bar sub-assembly are all an equal distance apart, center to center. Carriages on the conveyor system are moved forward, at predetermined intervals of time, from the one station to the next succeeding. Each carriage has a right-hand side-bar exactly positioned on a fixture at one side and a left-hand bar similarly placed on the other side.

The carriage is moved forward one space. It stops and the fixtures on top move outward a definite

distance (sidewise) for the operation to be performed. A man places a hanger or other part in proper position, drives one or two rivets home with a hammer and the carriage withdraws the two parts. Then the whole machine moves the carriage forward another space.

At this next location, as soon as the members have been carried sidewise on the fixtures, an automatic mechanically operated riveting machine comes into play, forming the rivet head in a single crunch. All

of this movement is taken care of by the mechanism back of the machines, the riveting heads being opened up like jaws sufficiently (after acting) so that the carriage fixture may recede to the moving line without fouling any machinery.

So the operation goes on, station after station—19 in all—a hanger being attached here, a bracket there, a rivet (or two of them) driven in at this station, the end of the bar clipped off to final form at another station, until at the last of the 19 the two side-bars are completed. Here they are discharged automatically, the rights to one side, the lefts to the other, for inspection.

Meantime, the transverse members, shorter and less complicated, have been made on 4 similar

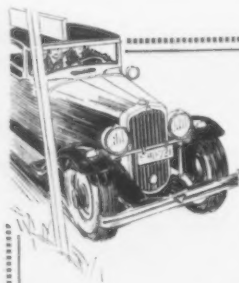
lines of machines and they in turn arrive at the same point for beginning assembly.

#### *Bringing All the Parts Together*

**A**SSEMBLY of the frame, from the sub-assemblies briefly outlined, takes place in three parallel lines running across the building. Each frame traverses all three lines, moving south on one line, then north on the center line and finally south on the third line to completion. This contrasts with the side-bar sub-assembly, which was all on one straight-away line running lengthwise of the building.

This general assembly performs two important functions and does both entirely automatically. It collects all the required parts for the frame and assembles them, and it puts in all the rivets, finally "setting" each rivet by forming the rivet heads. One conveyor system with trucks takes care of the first function, a so-called "nailing machine" assembles the frame and puts in the rivets, while another conveying system equipped with other trucks handles the last function—the riveting. All three sub-units are synchronized and operated with one single motor.

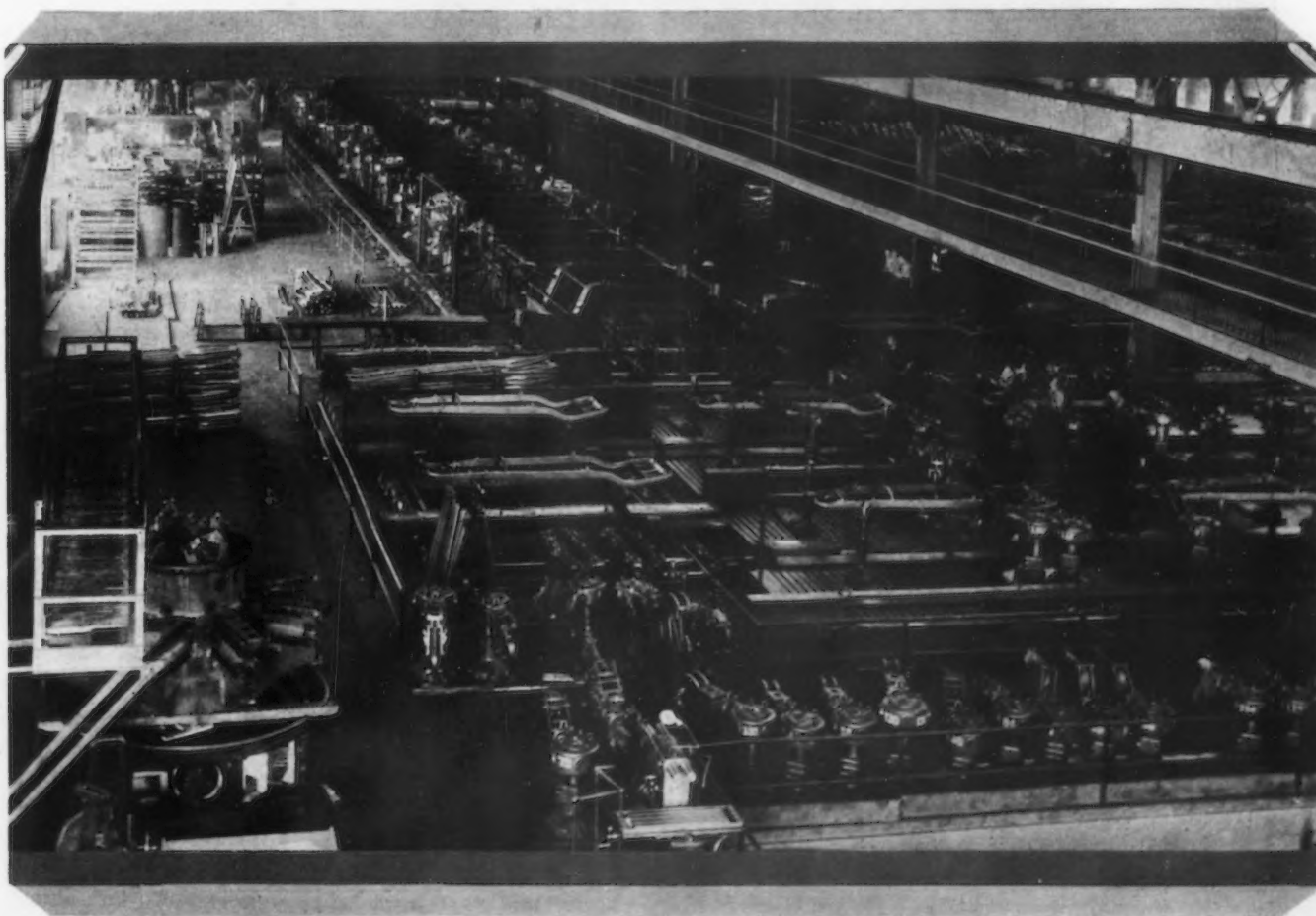
A special set of carriages, operating on a different time schedule, and entirely independent of the side-bar sub-assembly, functions during assembly. A



**S**ELECTING and straightening steel strip, putting it through pickling vats, forming it into side-bars, attaching hangers and clips, assembling rights and lefts with their transverse members, riveting all into a completed automobile frame, cleaning, painting and drying—all in 1½ hours—these operations performed by mechanism, are described here. Each piece is 8 seconds behind the next one, for the plant is geared up to 450 finished frames an hour. Fractions of seconds count here, so everything must fit exactly where it belongs, if the whole works is not to suffer.



**A**UTOMATIC Riveters at Work on Final Assembly. Near upper left the loose parts are moving toward the "nailing machine," shown in center background. Thence the frames move toward the observer, on second line, and away from observer, on line in foreground. The riveters approach their work, perform it and recede. Then the frame moves to next station (above). In upper center (below) is the end of side-bar sub-assembly. Two frames on racks in center of picture are passing from middle assembly line to the final line at right. Spare riveting machines appear in foreground



right side-bar and a left side-bar are placed in fixtures on the carriage, both bars being positioned definitely some inches farther apart than they will be in the completed frame. As this assembly rig moves forward to one station after another, the various cross-bar or transverse members are also put into their respective positions in fixtures.

Eventually this group of related parts reaches the

Two trips are made across the room, between rows of riveting machines. After the first passage the entire carriage with fixtures and frame is moved sideways to the next line. It then makes the final trip through the last row of machines, and emerges at the far end with all rivets properly headed and ready for inspection as a finished frame.

Four to eight riveters here function at each station, half on each side of the frame. Having performed their task, their withdrawal precedes, by a tiny interval of time, the controlled movement of the carriage to the next station.

It is the great precision with which all of the motions of such a complicated machine are synchronized which perhaps most impresses the visitor. A definite time element enters, inasmuch as the entire plant is geared up to a production of 450 frames an hour. This means that, on the average, each operation in each one of the major production lines must be performed in a matter of 8 sec. It must be realized that this 8-sec. period covers not only the manufacturing operation, but also the time interval required for bringing into position, withdrawal of working tools and movement to the next position.

From the automatic inspection machine, which straightens and checks every piece of strip steel as received from the mill, to the delivery of an enameled automobile frame into storage takes 90 minutes. During this period the steel is passed through the pickling vats, delivered to the automatic machinery briefly described in the above paragraphs, completely processed, assembled, inspected, washed clear of all grease and

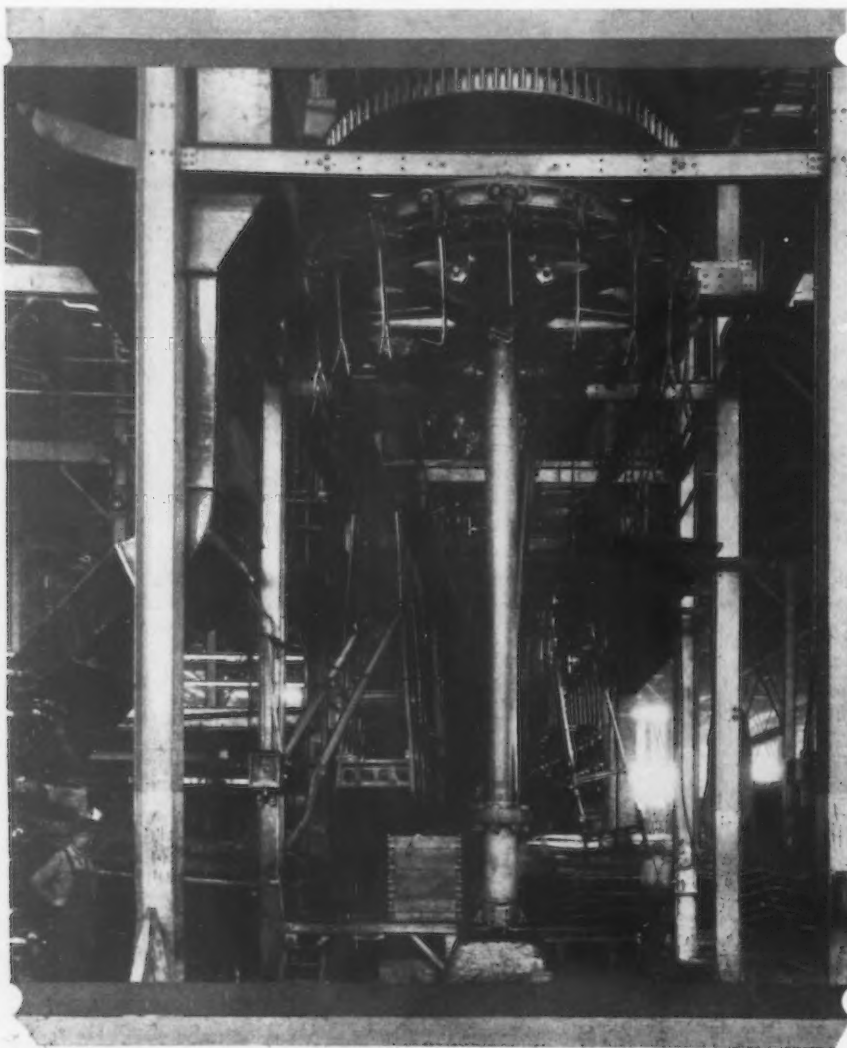
dirt, painted and finally baked.

#### *How the Many Conveyors Operate*

**A**LMOST every conceivable type and design of conveyor is used in this automatic plant. Under the pressure of necessity, inventive skill has here brought out a startling variety of material-handling devices. Many old and approved means were utilized, but in addition a great many entirely new devices were invented.

The common reciprocating rail feeder found use in many instances, as for the inspection machine, the side-bar and cross-bar press lines. However, it ap-

(Concluded on page 1728)



**PAINTING** Conveyor, Showing a Frame at Left Being Picked Up from Exit of Cleaning Oven, to Proceed Through Painting Oven and Return, at Right, Dry and Ready for Storage

nailing machine at the end of this first line, moving sidewise into the nailing machine proper. There the two side-bars are shoved up against the ends of the transverse members, and thus into final position. Automatic rivet-feeding heads swing up into position and rivets are shot into the holes waiting to receive them. Air pressure accomplishes this task, about 100 rivets of varying sizes, from feed-hoppers below, being put into place accurately, definitely and quickly, in one operation. Then, the nailing heads being withdrawn, the whole frame, with the parts now in final juxtaposition and held together with unheaded rivets, is picked up and placed on a truck in the middle assembly line, parallel to the line which took the frame parts into the nailing machine.

# Control of Quality and Combustion in Making Steel



**L**ARGE blisters in the center at one end of a sheet made from a soft steel rimmed heat were reported by the chairman of the Rimming Steel Quality Control Committee to be due to segregation. He had made analyses of such spots and found the carbon, manganese and sulphur all higher than called for. He attributed this trouble in the sheet to insufficient cropping of the bloom. These ingots raised after pouring.

Small blisters on sheets, which have been a cause of perennial trouble, are difficult to remedy. We do not know fully what produces them. A comprehensive report on this subject, however, was made at the Youngstown meeting in May, 1928.

Temperature difficulties or differences, particularly too hot a temperature, were given by one man as the main cause of blisters. This results in too thin a slag and other conditions, one leading to another. Such a steel is too slow in starting to rim. A metallurgist reported that blisters seem to come in occasional doses. His plant had run at one time for 18 months without any such trouble, and then ran into a lot of bad cases. This spotty experience seems to have been observed by other men present.

## Getting Away from Segregation

A man making largely forging steel reported getting away from segregation by melting well above the carbon for which the steel was to be made, and then working it down by stirring with rods. This practice permits him to carry, all through the refining period, a slag very similar to a finishing slag. He makes ingots all the way from 20 in. to 80 in. in diameter, and weighing from 8000 to 200,000 lb. each. His charge is 45 to 47 per cent iron, with ore used only occasionally and very little.

Segregation on the 80-in. ingots is reported to be no worse than on the smaller ingots. These large ones are poured with the large end down, while those of 42 to 64 in. are customarily poured inverted. All are teemed through a 2-in. nozzle. The 80-in. ingots are stripped in from 36 to 39 hr.

Rail fractures, one man reported, are caused mainly by segregation in one or more of three elements—carbon, manganese and phosphorus. Carbon, he says, is the worst offender. Both carbon and manganese concentrations are blamed for brittleness.

Chipping costs were given considerable attention,

This follows the first instalment, telling of the meeting of the Open-Hearth Committee, published last week, page 1601.

very complete records having been kept by one organization. In general, the bottom bloom from an ingot has the highest chipping cost, and the figure drops successively through the different blooms. On eight or nine heats, completely analyzed, the average cost was about \$1.30 to the ton of steel. The average of all the low figures on these heats was 37c.; of the high figures, \$2.40 a ton. The maximum for any ingot was \$4.82, and the minimum 10c. The lowest average for any heat was 55c., and the highest \$2.39 a ton.

Variation from ingot to ingot within a heat was reported by two speakers to be greater than the variation from heat to heat, using average figures for similar grades of steel. Attempts were made to eliminate other variables, such as the individual soaking pit in which the steel was held. In some cases, the high and low-cost ingots were in the same pit.

All of these heats were poured under normal temperatures and other conditions. There is much speculation as to the reason for this great difference in result, and the matter is being probed further.

Another speaker reported having had results of tests examined from 43 different heats of steel. Each heat had about 16 ingots, and tests were taken from the second, seventh and fifteenth in each case. The cost ratios ran about 3:3:8. This was fairly uniform for nearly all the heats, the highest cost being for the fifteenth ingot.

## Getting Carbon Analyses Quickly

**U**SE of a carbometer was reported by one operating man to give him his carbon determination in about 3 min., for high-carbon steels. With low-carbon steels the test takes 5 min. or so, because the steel is held about a minute longer in the mold. The chairman reported that accuracy of about 2 points is claimed on any carbon of around 0.40 per cent.

One operator reported using this method on all steels having above 0.12 per cent carbon. He uses it particularly in making steels calling for a carbon range of about five points, and gets the results in 4 or 5 min. He reports that they check within one or two points of the more leisurely laboratory analysis. These test pieces are all killed in the spoon with a small quantity of aluminum wire.

Combustion tests take about 30 min. for completion at one plant. When the heat nears the stage at which reports are wanted, a test is taken every 15 min. Thus there is a report every 15 min., but at a lag of 30 min. from the successive tests.

## Combustion Control

**C**ONTROL of combustion gives uniformity of production, uniformly high, said Joseph F. Shadgen, of the Smoot Engineering Corporation, New York.

While his discussion was based upon his own experience in installing Smoot apparatus, it was given a general character applicable to other types of control. Control gives a consistency of performance whereby today's record is like that of yesterday's and tomorrow's is a repetition. Better quality of metal is produced because the combustion conditions remain as set by the equipment.

This whole matter of combustion control is still in the development stage. In application, it all comes down to education of the personnel. The operating men at first are not pleased with the innovation. It seems to discredit their own attainments and take away a part of their responsibility for making good steel.

After a week or two, much of this latent opposition tends to disappear. The benefits of better quality and higher tonnage make themselves manifest, and presently the men reach the conclusion that the equipment is very much worthwhile. After a month or two it has been found that the melters will not willingly operate without control equipment.

#### Meeting an Engineering Problem

Each furnace is proverbially an individual. However much alike furnaces may be built, they have their separate characteristics and must be handled as such. The application must be along engineering lines; the mechanical equipment must be fitted accurately and erected properly and the clearances must be as close as can be had.

Much research work is needed along this line. There are so many variables that considerable study will be needed on existing and prospective installations before we can be entirely sure as to how control can best be handled. The one great benefit from combustion control is that the matter of combustion is set once for all, and thus this one of the many variables is eliminated.

For proper operation the furnace pressure must be maintained at a definite point. A forced draft fan in connection with this is desirable, because it gives a ready means to regulate the pressure. Also, this makes the operator independent of measurement of the air conditions and of stack changes.

#### Long Tonnage Runs on Controlled Furnace

Commenting upon this discussion of the value of combustion control equipment, one operator who has installed such equipment told of getting 536 heats from his controlled furnace in the first run. Then the furnace was taken off for repairs, not because the roof had gone, but for another reason. There was still 10 in. of thickness left in the 15-in. roof.

There was little difficulty found in this furnace, the down-takes and slag pockets and checkers being in good condition. Oil consumption during the entire run averaged about 26 gal. So far with the succeeding run the average has been 25 gal. to the gross ton of ingots. Burnt lime is used.

Another operator reported upon a controlled (25-ton) furnace put in in 1927, insulated with Sil-o-cel and sheathed with steel plates over the necks and regenerators. The furnace has a 12-in. roof. After running 500 heats this was shut down because of obstruc-

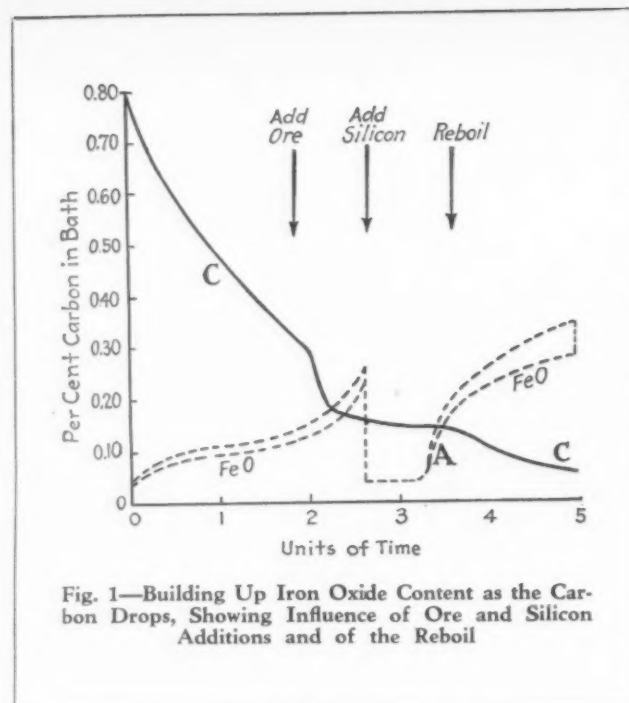


Fig. 1—Building Up Iron Oxide Content as the Carbon Drops, Showing Influence of Ore and Silicon Additions and of the Reboil

tion in the regenerators, which resulted in closing the flues. The roof was found burnt only about 1½ in.

#### Regenerators Need Absorptive Powers

In rebuilding, the regenerators were redesigned, but proved not to have enough absorptive capacity for heat, resulting in the stack temperature running up to 1350 deg. Fahr., in place of the previous 1150 deg. The furnace was shut down after 1080 heats to take care of a clog in the regenerators, caused by a water leak. All this time no change was made in the roof.

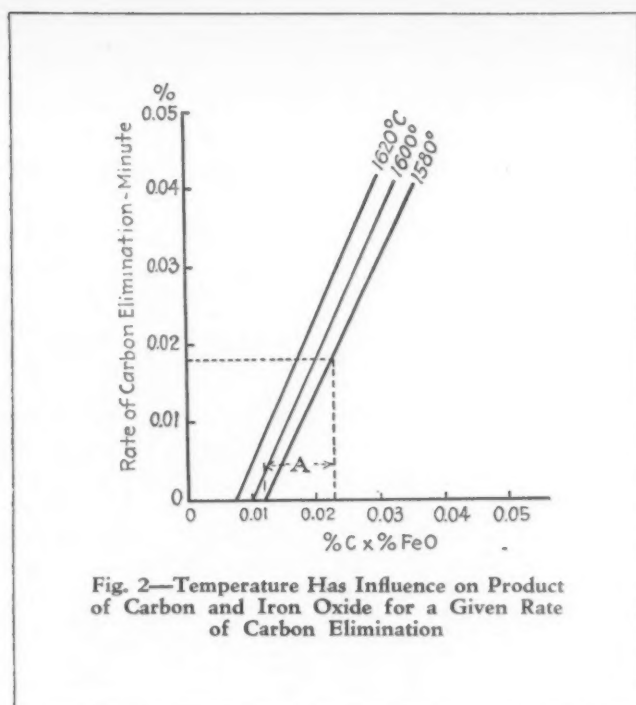
Starting up again, the furnace reached 1500 heats and again had trouble from a water leak in the regenerators, the bottom of which was about 12 ft. below the ground water level. At 1975 heats the same trouble again had to be remedied, after which the furnace ran to a total of 2532 heats, and then was shut down for repairs.

This is an acid furnace. During its first 500 heats it used about 26 gal. of oil to the ton. The figure went up to 29 gal. after the checkers were redesigned, because of insufficient heat-absorbing area. Its average over the entire run of 2532 heats, lasting from January, 1928, until April, 1930, was 29.9 gal. The tonnage charged in this period was 64,205.

#### Ran 2532 Heats on One Roof

During all this period there were no repairs on the roof or the backwall. There were new front arches required, mainly because of damage from charging boxes. Draft was entirely natural, to the stack, having 11 or 12 in. of damper opening. As this furnace is used in a steel foundry, where the yields run from 62 to 63 per cent, the fuel consumption was based upon the charge. One steel-works operator announced that the figure given would be equivalent to about 34.5 gal. to the ton of ingots, if ingots had been poured.

Another operator using a different type of control for combustion reported that the furnaces having that



control have a better production rate by about 10 per cent than the furnaces without it. The fuel rate has been improved, by the control, about 8 per cent.

### Steel Melting Progress Report

SEVERAL topics were introduced as the report of the steel melting committee, of which Dr. C. H. Herty, Jr., is chairman. There were progress report on the work done in the study of oxides in steel, another progress report on the effect of residual alloys coming from the scrap in the charge and a brief discussion of the speaker's aluminum oxide method of measuring steel oxidation.

Alloy contamination may come from either the pig iron or the scrap. Even a trace of tin, picked up from the scrap or otherwise, is found to be fatal to the use of sheet steel for deep stamping. It does not affect other steels so badly, but must be kept below 0.5 per cent if the material is to be rolled into rails. In many cases steel will not roll at all if it has as much as 0.75 per cent of tin.

ALLOY CONTAMINATION OF OPEN-HEARTH STEEL  
December, 1929, January-February, 1930

Plant No.	C	Mn	Cr	Va	Ni	Cu	Tin	N <sub>2</sub>
1	0.13	0.11	0.035	Nil	0.090	0.208	0.041	0.002
2	0.33	0.24	0.080	0.001	0.026	0.049	0.004	0.002
3	0.28	0.42	0.024	0.002	0.061	0.196	0.033	0.005
4	0.30	0.40	0.027	0.001	0.057	0.038	0.004	0.002
5	0.10	0.16	0.017	0.002	0.028	0.060	Nil	0.001
6	0.05	0.15	0.004	0.002	0.044	0.081	0.011	0.004
7	0.57	0.25	0.045	0.002	0.081	0.043	Nil	0.004
8	0.12	0.20	0.003	0.002	0.053	0.063	Nil	0.002
9	0.71	0.35	0.043	0.002	0.006	0.058	Nil	0.001
10	0.17	0.32	0.027	0.002	0.046	0.117	Nil	0.004
11	0.14	0.16	0.069	0.003	0.008	0.099	0.016	0.001
12	0.07	0.11	0.032	0.002	0.045	0.219	0.028	0.005
13	0.08	0.18	0.006	0.003	Nil	0.058	Nil	0.006
14	0.03	0.08	0.004	0.002	0.058	0.092	Nil	0.003
15*	0.80	0.26	0.009	0.004	0.066	0.150	0.058	....
Average by tonnage .....			0.020	0.002	0.045	0.086	0.006	....
Average by plants .....			0.030	0.002	0.043	0.099	0.010	....
Automobile scrap heat, 60 per cent scrap, 40 per cent metal .....			0.016	0.010	0.120	0.292	0.053	....

\*Only five days' sample submitted.

With less than 0.40 per cent of tin steel may be forged readily. With that amount or greater, however, the bars become red-short and have to be reheated time after time if there is much of a forging operation to be done.

### Copper Not Always Deleterious

There is much difference of opinion as to the effect of copper. It was stated that some of the troubles commonly attributed to copper are very likely to be due in the last analysis to sulphur or oxygen in the presence of copper. A steel that has both high sulphur and high oxygen content may be very red-short, whether it contains copper or not. However, with either high sulphur or high oxygen the copper may be the cause of the red-shortness.

Fifteen steel companies have been cooperating for several months in sending in samples from one or more heats a day, for the purpose of determining some of the characteristics resulting from these alloy inclusions. A strong plea was made for further co-operation, so that the results might be more representative. The table gives the result of the average returns from the 15 companies reporting during December, January and February. Later reports are in process of compilation. The 15 companies reporting have an annual capacity of about 7,000,000 tons of steel.

### Determination of Steel Oxidation

Fig. 1 represents the progress of an open-hearth heat after melting at about 0.80 per cent carbon. The carbon *C* drops rapidly, as shown. It takes a still sharper drop when ore is added to the bath, and then resumes something of its former curve. At the reboil, which takes place after the addition of silicon has been melted, the copper drops off at an increased rate, as shown.

Meantime, the iron oxide has been going gradually upward from a light figure at the time the charge was melted. Addition of silicon drops it sharply and it holds a low level while the silicon is melting. Then it climbs rapidly, the slope of the climb being controlled by the slag conditions, until at the end it may be around 0.20 per cent.

There is a fairly well defined band of iron oxide content, as shown by the two lines covering this phase. This band has a greater width as the heat proceeds until, at the end of the heat, it may be two or three times the width attained at the time of adding silicon.

### Conditions Affecting Iron Oxide

As will be noted from the diagram, the building up of the iron oxide content becomes much less rapid immediately after the reboil. This is because there is so much oxygen taken out of the bath by the reboil and there is less of it left to combine with the iron. This accounts for the widening of the band of iron oxide, as less and less carbon remains to take it out of the bath.

The iron oxide content of the bath at any given time is governed by two things: The rate of putting it into the bath from the slag and the rate of taking it out by the influence of carbon, changing the FeO to Fe + CO. Agitation in the bath may vary this

rate enormously—in one case measurements show variations from 7 lb. a minute to as much as 300 lb. This agitation is controlled almost entirely by the rate of carbon elimination. If there is a high amount of FeO in the slag, a high temperature and a fluid slag, together with much agitation, the absorption of FeO into the metal may be fast. If, however, these four conditions be reversed, it will go in slowly.

#### Relation of Carbon to Iron Oxide

Rate of carbon elimination may be given by the formula  $C \times \text{FeO}_a - C \times \text{FeO}_e$ , in which  $a$  represents actual conditions and  $e$  represents the condition

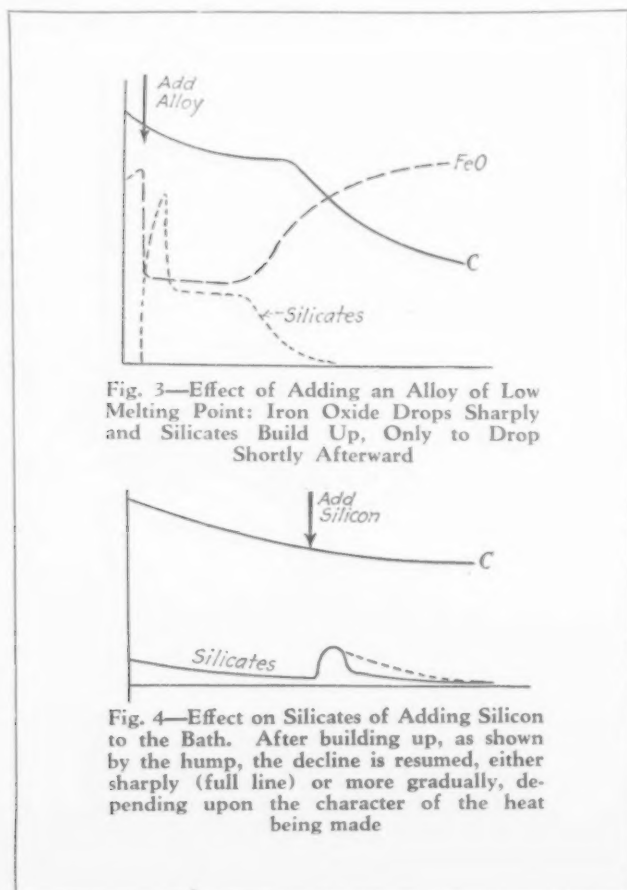


Fig. 3—Effect of Adding an Alloy of Low Melting Point: Iron Oxide Drops Sharply and Silicates Build Up, Only to Drop Shortly Afterward

Fig. 4—Effect on Silicates of Adding Silicon to the Bath. After building up, as shown by the hump, the decline is resumed, either sharply (full line) or more gradually, depending upon the character of the heat being made

at equilibrium. This equation shows the minimum FeO which can be obtained for a given carbon content at a given temperature. A higher temperature reduces the FeO for the same carbon content, as is shown in Fig. 2. In that diagram A shows the difference represented by the formula above.

For example, if  $C \times \text{FeO} = 0.01$ , and the carbon is 0.10 per cent, this heat will have no more than 0.10 per cent FeO, for  $\frac{0.01}{0.10} = 0.10$ .

Measurement of steel oxidation by the aluminum method is based upon the equation  $2\text{Al} + 3\text{FeO} = \text{Al}_2\text{O}_3 + 3\text{Fe}$ . By multiplying the observed  $\text{Al}_2\text{O}_3$  by 2.11 the FeO content is obtained. This factor takes account of several smaller elements entering into the matter, such as MnO, etc.

#### Cleaning Up Dirty Steel

Study of a number of alloy heats has been made by Doctor Hertzy, all of which showed up as very dirty

steel at the time of the reboil after the silicon addition. In other cases, however, when ferromanganese was added to the bath just before the silicon, the heats there were found to be clean at the reboil or to clean up rapidly afterward. Indications of this are shown in the table, for representative heats of this character.

Percentage of Silicates in the Bath

	10 Min. Before Reboil	At the Reboil
A—Silicon added alone.....	0.063	0.061
B—Manganese added, 7 to 10 min. before silicon.....	0.038	0.015
C—Special alloy used.....	0.070	0.003

In the case of heat A, where the analysis for silicates shows almost the same at the reboil as 10 min. before, it is evident that practically all of the cleaning up of the heat occurred after the reboil. With heat B, however, in which the ferromanganese was put in from 7 to 10 min. ahead of the silicon, not only was the heat much cleaner, but much of this cleaning up had been done before the reboil occurred. The same is true of the third heat, in which a special alloy mixture was put in which has been designed for the purpose of cleaning up these heats.

(To be concluded)

#### Metals Known to the Ancients

EARLY uses of metals were discussed by T. A. Rickard, Berkeley, Cal., former editor of *Mining & Scientific Press*, before the last meeting of the (British) Institute of Metals. Mr. Rickard brings a wealth of information to bear on the subject gleaned from visits to mineral deposits in all parts of the world, from ancient writings, and from the work of archeologists.

He contends that gold was the first metal used. It existed in the pure state as bright nuggets in stream beds in all countries—the primitive highways—and is easily malleable into ornaments, but is too soft for useful tools. Native copper nuggets furnished the first tools; it also is a material widely distributed in nature, "its use marks the beginning of every ancient metal culture," and relics pre-dating 4500 B.C. have been found. Native silver ornaments are also contemporaneous. The first iron articles were fashioned from meteorites at a considerably later date.

Discovery of means to fashion pure metal by melting and casting introduced the age of metals. A later and longer step forward was the ability to smelt an impure ore. This was first practiced about 3500 B.C. Smelting of copper oxide or carbonate to beads of copper will occur in any vigorous wood fire; ores containing mixed minerals of two or more metals were smelted similarly into the alloys now known as brass, bronze and German silver. These were valued for their superior hardness, either as cast or after hammering to shape. Alloying by making the pure metals and proportioning them accurately in a crucible is an art quite modern in comparison.

Smelting of iron ore to a metallic sponge and its welding and forging into tools requires enormously more knowledge and skill than the making of a natural brass or bronze. The earliest records of the use of iron tools in such quantity and for such purposes as to suggest manufacturing operations, indicates that this was started about 1400 B.C. in Asia Minor.

Of the other metals, lead is supposed to have been discovered in the period 3000 to 2500 B.C., from its association with silver. Zinc, due to its property of boiling and burning at such a low temperature, was not made direct from ore until the sixteenth century.

# Conveyors for Core Ovens

**E**CONOMICAL transportation of cores has been the subject of much study. The earliest type of core oven was a large box or room heated to baking temperature. The cores, placed in racks, were transported to and from the ovens by means of lift trucks. Objections to this method included:

Breakage of cores, investment for trucks and truck maintenance, large number of racks and the amount of floor space and labor required.

The first noted improvement was the substitution of I-beam monorail and trolleys for lift trucks. The core racks, suspended from trolleys, were transported to and from the ovens, and the monorail served as a storage and cooling space.

## Meeting Increased Production

The advent of mass production in all branches of industry, especially noticeable

\*Manager, foundry division, Palmer-Bee Co., Detroit. This is taken from a paper read at Cleveland before the American Foundrymen's Association.

## Progress Made from Year to Year in Efficiency of Both Oven and Conveyor—Convenience a Chief Factor

BY D. B. HILL\*

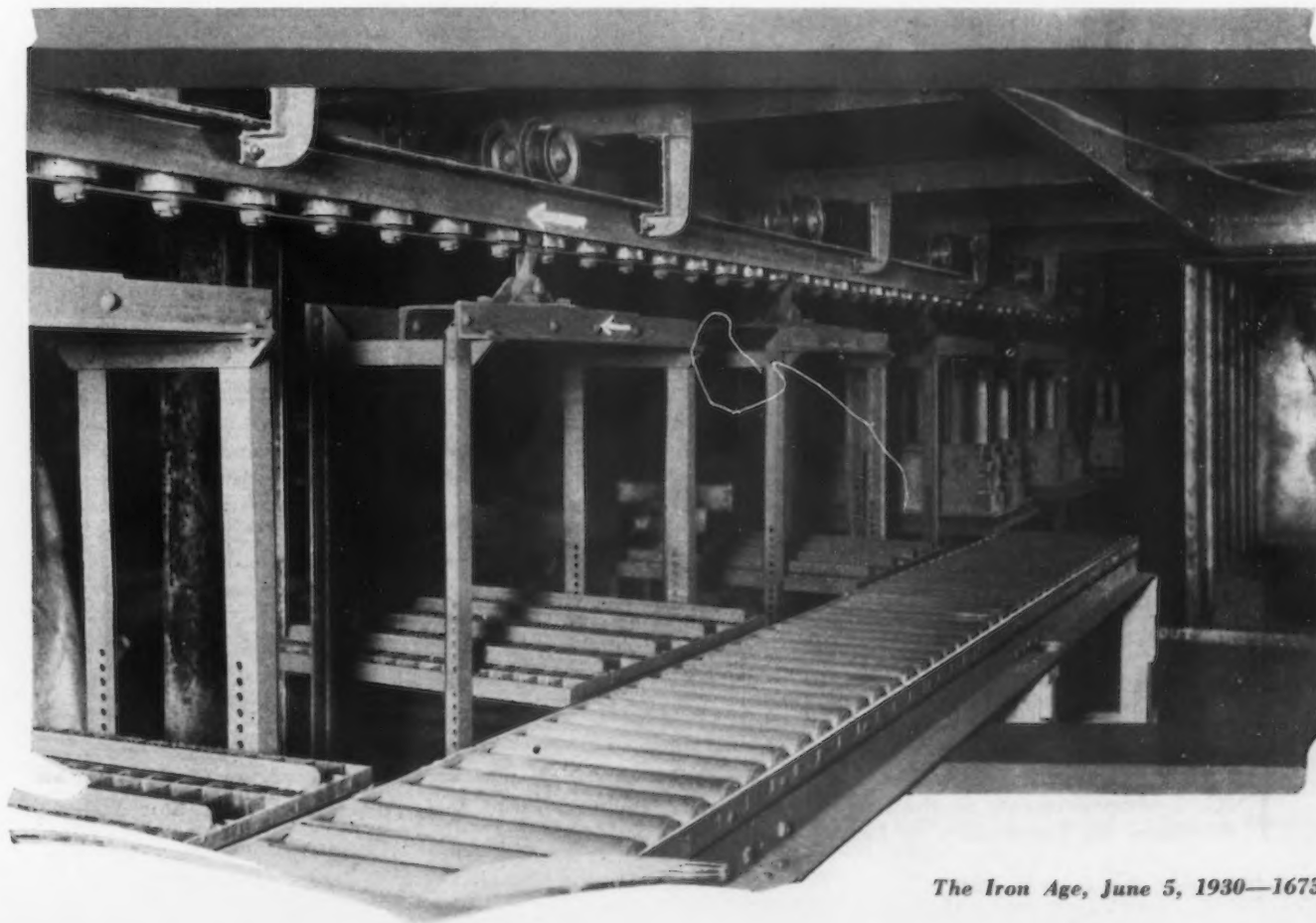


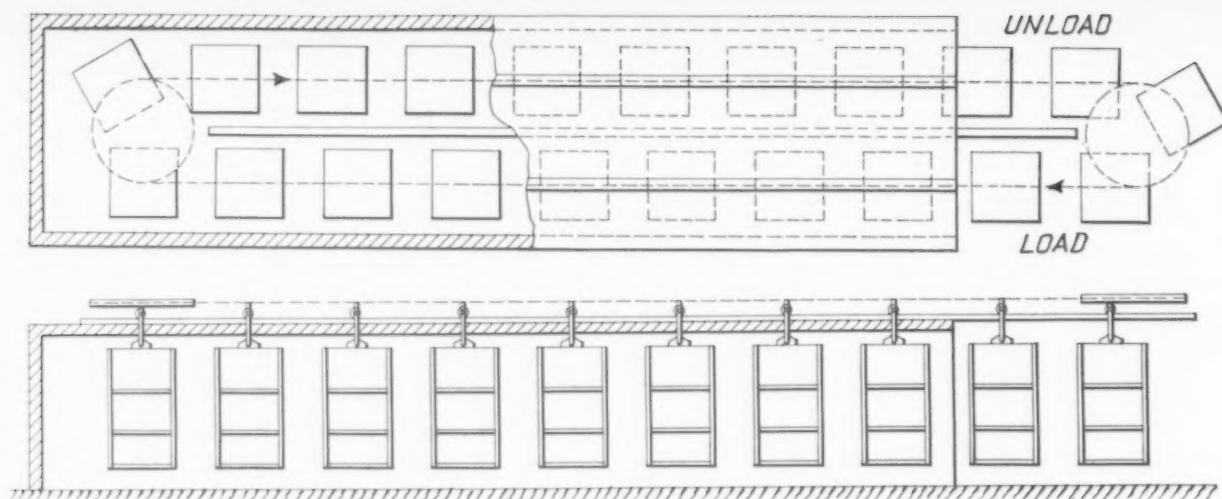
in the manufacture of automobiles, made large production foundries necessary. Soon engineers needed increased core room capacity. The continuous movement of cores through the operations of making and delivery to molders was suggested by progressive foundry and conveyor engineers.

This method would be in keeping with the continuous transportation of molds already adopted. But the wisdom of using conveyors for this purpose was questioned by many. It was thought that vibration would break the green cores before they could be baked. The investment for continuous core ovens and conveyors seemed to be out of proportion to the work accomplished. The protection of the conveyor chain and mechanism from the oven heat presented a problem.

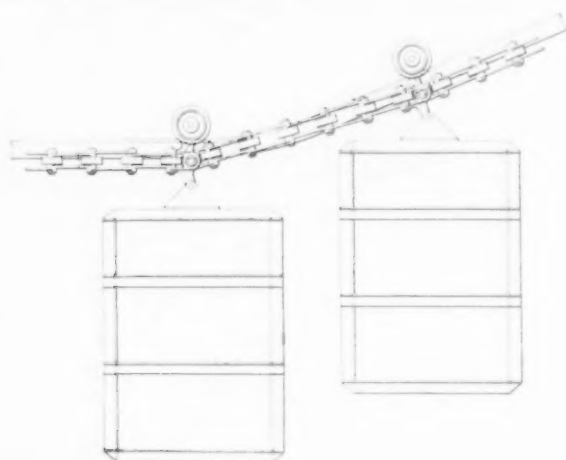
The earliest type of power-driven continuous core oven conveyor, Fig. 1, was successful enough to justify the idea that cores could be baked by a continuous process. This oven was of brick and employed two sprockets with a conveyor chain placed

Unloading Point of Oven Shown in Fig. 5, with Gravity Conveyor Alongside to Receive Baked Cores. This arrangement permits quick classification of cores





**FIG. 1—Early and Simple Type of Conveyor Core Oven**



**FIG. 3—Form of Chain to Make Both Vertical and Horizontal Bends**

above the oven. Slots through the roof permitted the suspension member connecting the trolley with the core rack to follow the travel of the chain. Objections found in this design were:

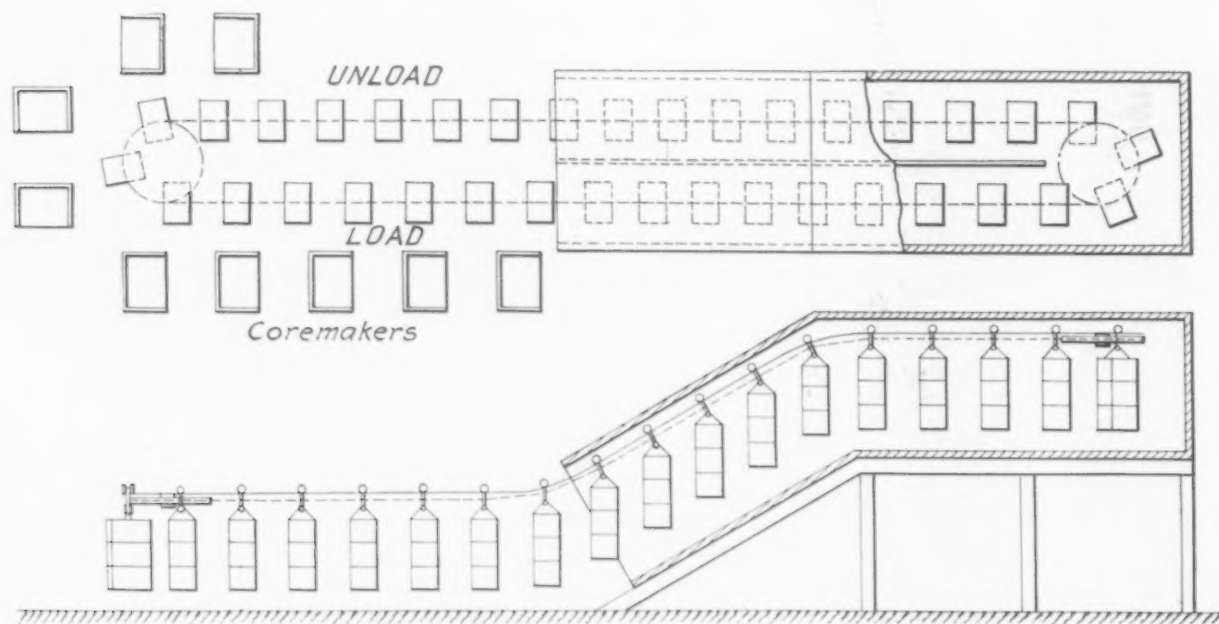
Enormous heat loss due to slots in the roof of the oven and the lack of heat seals at the entrance and exit,

Oven occupied much useful floor space,  
Loading and unloading spaces limited,  
Insufficient cooling time,

Transporting green cores, due to inability to group coremakers adjacent to loading point.

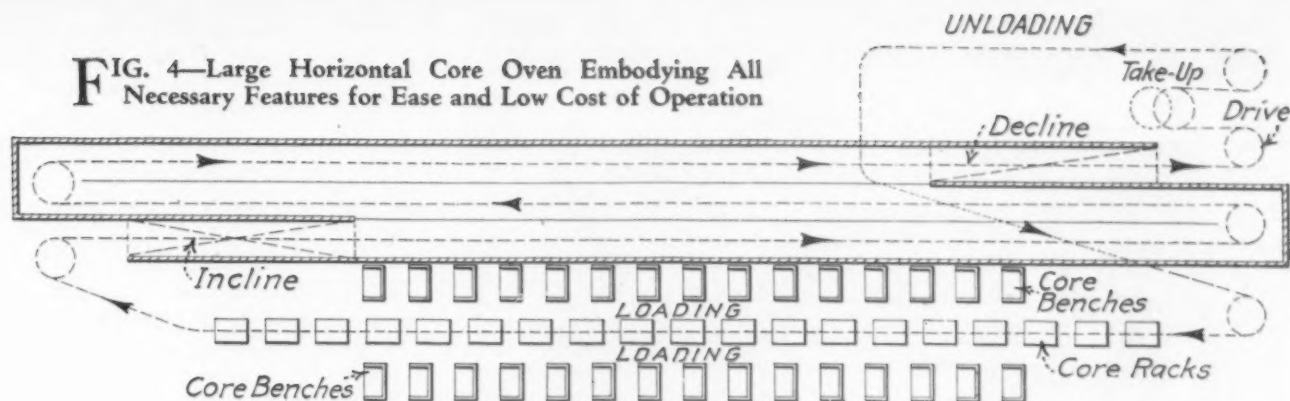
#### Horizontal Ovens

To overcome some of these objections, the design shown in Fig. 2 was offered. The first oven of this type occupied a comparatively small floor space, due to the type of cores produced. It was designed for cores requiring a short baking time. By making the conveyor outside of the oven of sufficient length to include cooling period and unloading space, together



**FIG. 2—Improvements on the Early Type Include Inclined Heat Seal, Absence of Roof Slot and Provision for Coremakers to Load Directly**

**FIG. 4—Large Horizontal Core Oven Embodying All Necessary Features for Ease and Low Cost of Operation**



with the space around which the coremakers were grouped, the objections found in the oven of Fig. 1 were overcome.

Inclination of the entrance and exit of the oven formed the heat seals. This construction required the use of sheet metal ovens instead of brick. Placing the conveyor in the oven eliminated the slots in the roof and reduced heat losses to a minimum.

To meet the conditions imposed by this design the conveyor engineers had to design a chain which would operate in both the horizontal and vertical planes. This resulted in the type of chain and trolley shown in Fig. 3, and shown on page 1299 of *THE IRON AGE* for May 1.

Trolley wheels 6 in. in diameter operate over double angle tracks and are fitted with anti-friction bearings. The trolley stem, suspended from a high-carbon steel shaft, supports the core rack in such a position that the shelves always remain horizontal. A transverse joint at junction of chain and trolley stem permits the chain to travel up and down inclines as well as on horizontal tracks. Rollers in the chain joints provide for operation around roller turns and traction wheels, and make action on the drive sprocket easier.

Trolleys equipped with anti-friction bearings are capable of conveying loads of one ton to the rack, with very little power. The largest oven of the horizontal type of which we have a record has 150 racks with a gross load of one ton each, and a 5-hp. motor drives the conveyor. An example of an oven of the larger type is shown in Fig. 4.

This oven is designed to serve bench coremakers. A conveyor passes between the two rows of benches.

The coremakers face the approaching conveyor and rack, permitting them to select a location to place their cores. A half turn of the body and a step is the only movement required to load the rack. The conveyor track is inclined so that the lower shelves of the rack are loaded as easily as the upper. With this load the rack travels up an inclined track of 20 deg. into the oven proper, traversing its length three times on level track fitted with expansion joints.

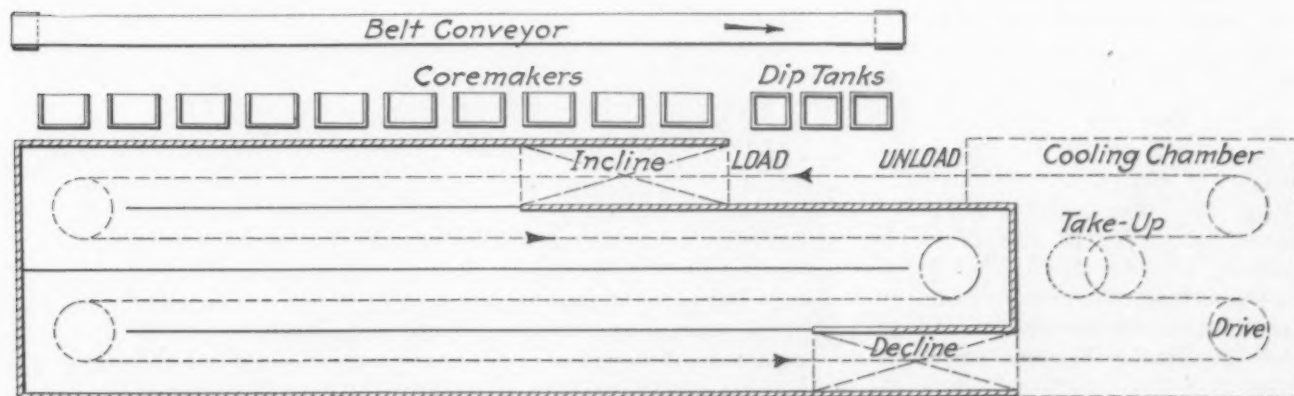
Leaving the oven over an incline, the chain converges into a horizontal track before reaching the drive sprocket. The contraction and expansion of the chain are compensated by the movement of the counter-weighted take-up carriage. This mechanism is located adjacent to the drive sprocket. From the take-up the conveyor passes around a roller turn to a portion of straight track where the racks are unloaded on to filing, sorting and fitting benches. From this point the empty racks pass underneath the oven to the original starting point. Sprocket and traction wheels are all mounted on anti-friction bearings.

#### Meeting Present-Day Requirements

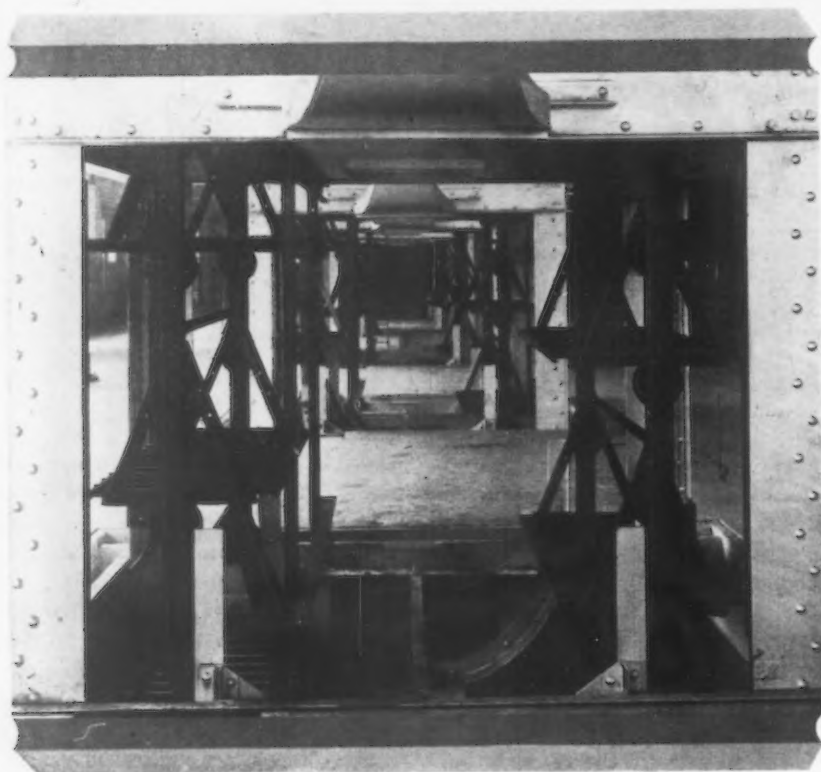
For a continuous conveyor oven to be successful the following conditions must be met:

1. Adequate and accessible loading space.
2. Ample baking time.
3. Sufficient time and apparatus for cooling.
4. Well-located unloading position.
5. Economical production of cores.

An oven having all of these features in combination is shown in Fig. 5. This conveyor makes four passes through the length of the oven. As the con-



**FIG. 5—Greater Efficiency Than in Fig. 4 Is Had by Keeping the Portion of Conveyor Not in the Oven as Small as Possible. Here it is a low fraction of the total length**



makers' benches, the time spent in walking to and from distant racks is eliminated. The labor used in transporting racks from the makers to the oven is entirely dispensed with. In loading rack-type ovens it is often necessary to move the rack several times before it is placed in the oven. One large automobile firm had a piece rate of  $1\frac{3}{4}$ c. for each movement of racks. This item alone amounted to thousands of dollars a year.

3. *Reduced core breakage.*—Handling cores on racks with trucks resulted in an enormous loss due to rough floors, collision with other objects, etc. With the smooth operation of the oven conveyor this breakage is negligible.

4. *Pace setter.*—The racks, traveling in full view of the operator, enable him to time his movements with the speed of the conveyor.

veyor leaves the oven it passes through an inclosed cooling chamber. This chamber completely surrounds the drive and take-up mechanism, and is supplied with the necessary fans for directing a blast of air on the cores. The cores are cooled to a temperature so that they can be unloaded with the bare hands.

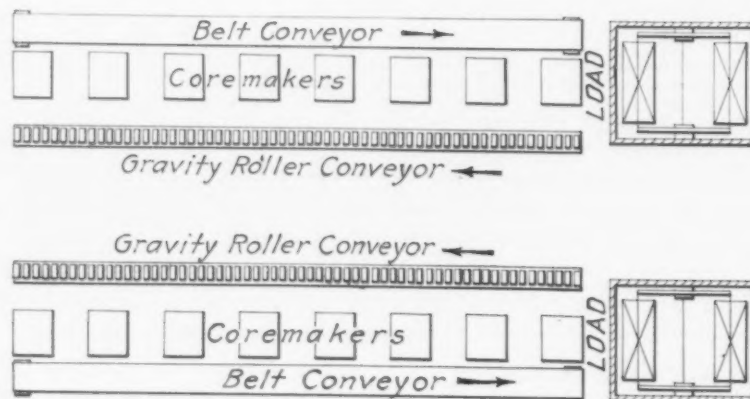
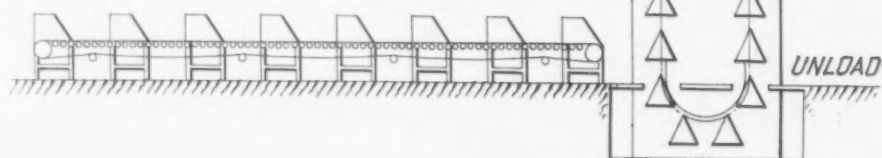
Cores, together with their plates, are placed on a gravity conveyor underneath and extending the length of the oven. Cores are unloaded and classified, and stored on racks or transported to the foundry. The plates are returned from the gravity conveyor to the coremakers' benches, adjacent to the oven. A belt conveyor directly behind the makers transports the cores approximately 100 ft. parallel to the oven. Cores are removed from the belt conveyor, dipped into a blackening tank, and loaded on to the conveyor racks just prior to entering the oven. This unit was designed to bake 480 crankcase cores an hour, and has been found capable of baking 600.

#### Advantages of Horizontal-Type Continuous-Conveyor Core Oven

1. *Saving in floor space.*—The space underneath the oven may be used for core or rack storage, sorting, filing, fitting, blacking, pasting or inspecting cores, etc. The ovens in many cases are supported above roof trusses, keeping the floor clear of supporting columns. In some installations the oven extends over an areaway between buildings.

2. *Labor saving.*—With the conveyor adjacent to core-

**Take-Up Mechanism**  
(Above) Has No Sprockets or Shaft. By flooring over the space between parallel strands additional loading space may be had. Several vertical units are seen, all as in line cut, which shows vertical oven with belt and roller conveyors serving it—one to bring raw cores and the other to take away baked cores (Fig. 6)



5. *Uniformity of product.*—With each rack-load of cores receiving the same baking and cooling time, the product will be uniform. This eliminates the human element, which enters into the loading and unloading of rack-type ovens.

6. *Working conditions.*—Heat is confined in the sheet metal oven with insulated walls and heat seals. With this construction a comfortable temperature can be maintained in the core room.

7. *Reduction of equipment.*—With the conveyor returning racks, core plates and dryers at regular intervals, the amount of this equipment is materially reduced. Increased production per man decreases the number of core machines required.

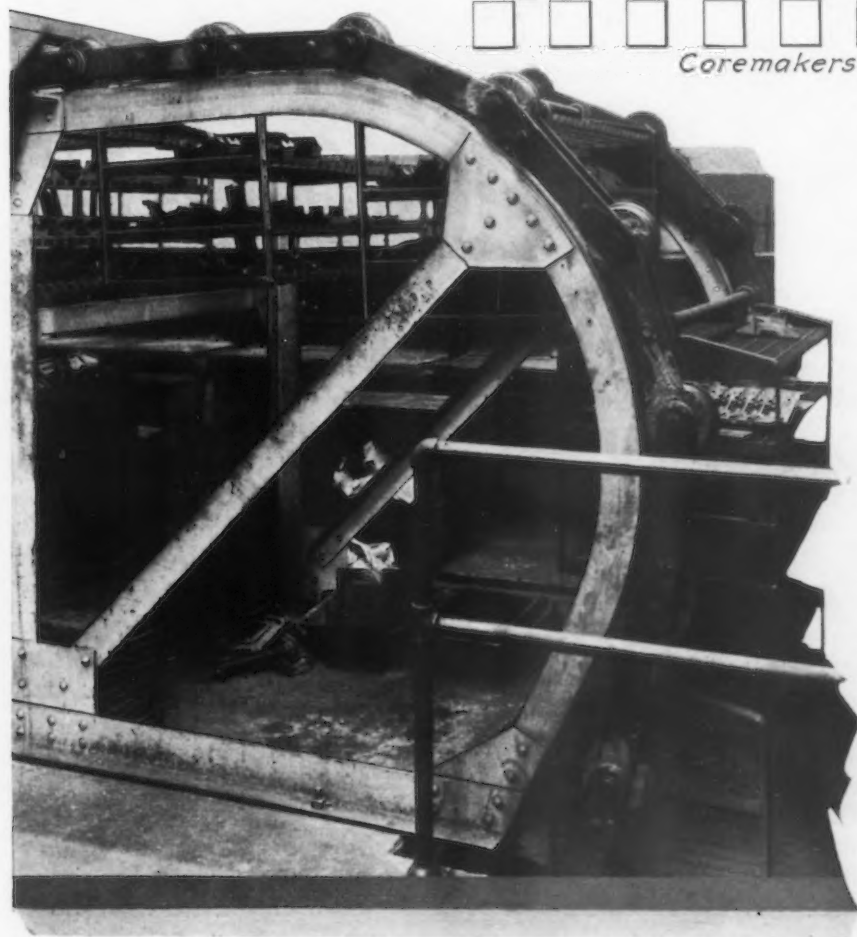
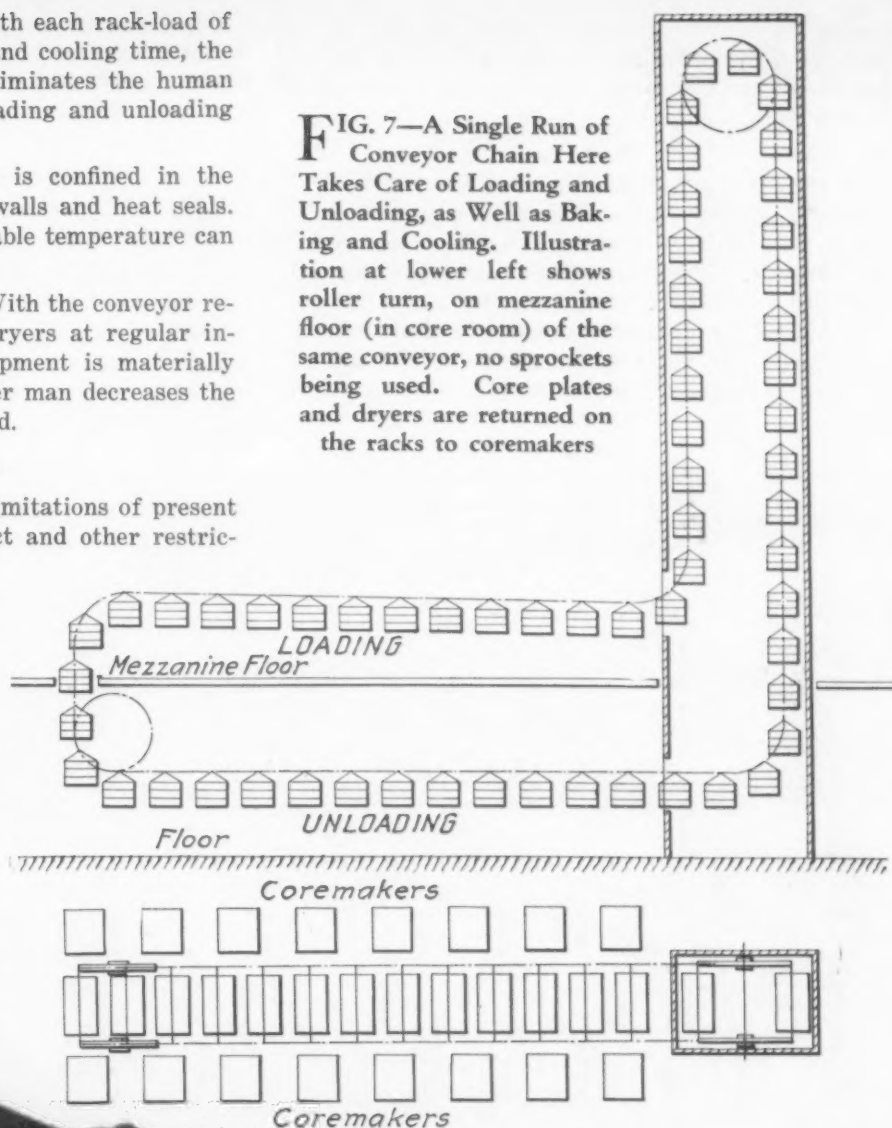
#### Vertical Ovens

Because of the architectural limitations of present core rooms, nature of the product and other restrictions, the vertical-type oven has met with the approval of a large number of plant owners and operators. The vertical oven is used to advantage for baking small cores, drying cores after blacking, drying cores after pasting.

Limitations of the vertical oven for baking cores are based on the requirements noted for a continuous-conveyor oven.

If the production is very large it is often difficult to place the coremakers in accessible position for loading directly on

**FIG. 7—A Single Run of Conveyor Chain Here Takes Care of Loading and Unloading, as Well as Baking and Cooling. Illustration at lower left shows roller turn, on mezzanine floor (in core room) of the same conveyor, no sprockets being used. Core plates and dryers are returned on the racks to coremakers**



to the core racks. To overcome this the coremakers are grouped parallel to a belt conveyor which delivers the cores from the makers to the oven. The belt conveyor is usually constructed of gravity carrier as idler rolls on the carrying side, to prevent undue sagging and resultant vibration in the belt.

As the cores reach the oven an operator is required to unload the belt and place the cores on the racks. The cores are usually unloaded on the opposite side, the plates remaining on the racks and being unloaded by the loading operator. These plates are distributed to the coremakers by a section of gravity conveyor extending the length of the bench layout. Two ovens utilized in this manner are shown in Fig. 6.

An unusual take-up mechanism is used in this design. It consists of a U-frame fitted with counterweights, if necessary, and eliminates the necessity of shaft and sprockets at this point. It meets the re-

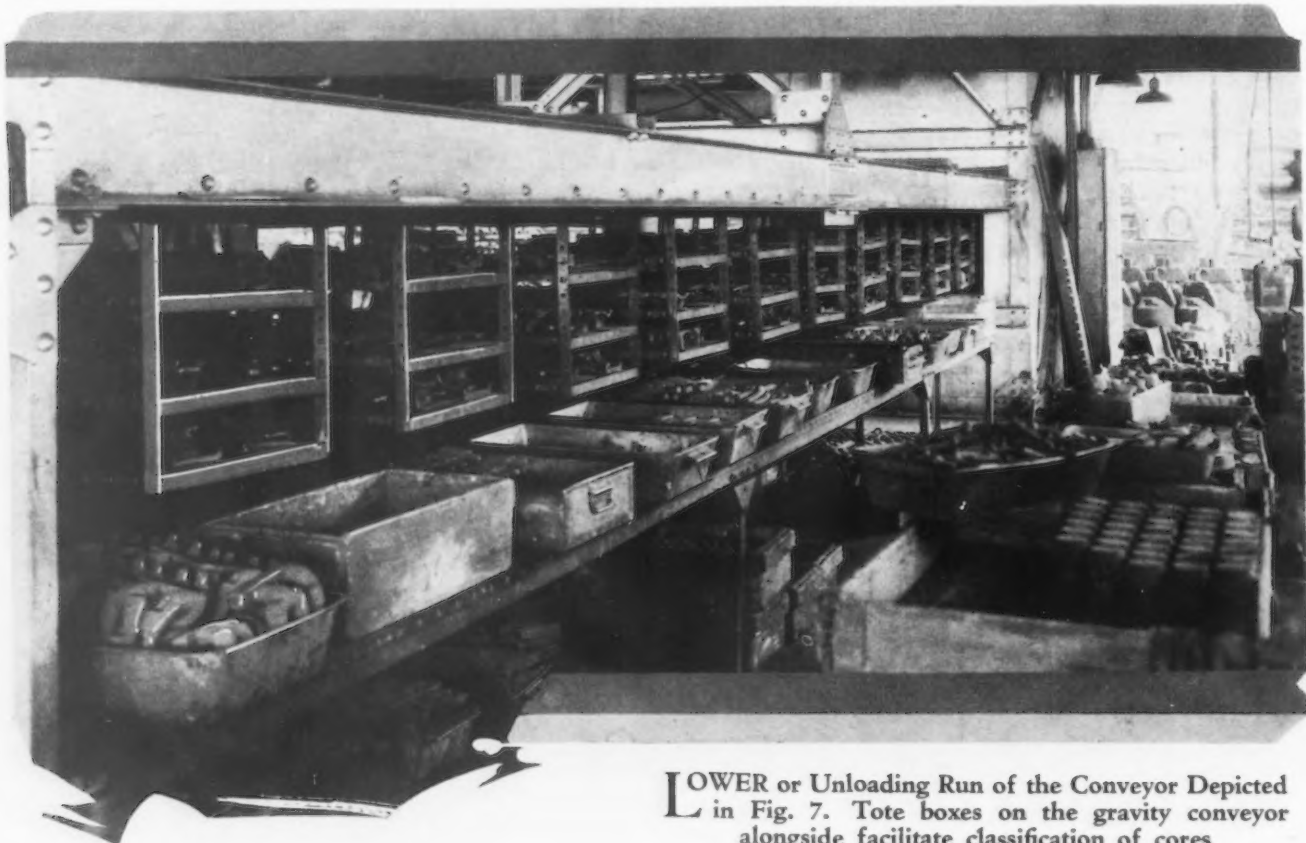
quirements of the expansion and contraction of the chain, and also provides for loading between the vertical strands of the conveyor. The space between the vertical runs of the conveyor can be floored over, giving easy accessibility to the coremakers.

A vertical oven is recommended for baking small cores only, because it is practically impossible to extend a vertical oven of this type sufficiently high to incorporate the required amount of cooling time and apparatus for large cores.

A unique design employing the vertical oven, together with a conveyor which serves the coremakers, provides ample cooling time, unloading space, and re-

quirement necessary for the successful operation of a continuous-type conveyor oven. The conveyor used in this and other vertical installations consists of two parallel strands of steel bar bushed roller chain. The rollers are unusually large in diameter, fitted with bronze bushings and provided with a large oil reservoir, eliminating the possibility of the conveyor operating without lubrication.

The parallel strands of chain are connected by means of cross-rods over which extra-heavy pipe is placed. The pipe provides for additional stiffness and, due to the fact that it is easily replaced in case of wear, it has proved an added feature in this design.



**L**OWER or Unloading Run of the Conveyor Depicted in Fig. 7. Tote boxes on the gravity conveyor alongside facilitate classification of cores

turn of plates and dryers to the operators, is shown in Fig. 7. The operators on this installation, all girls, are placed on a mezzanine floor and segregated from the male employees. The core room is fully inclosed. Proper lighting and ventilation are provided, making this department ideal for this type of work.

Benches are located adjacent to the upper run of the conveyor. The conveyor is inclined so that the top and bottom shelves are loaded without undue exertion on the part of the operators. The conveyor passes through the vertical runs of the oven. On the descending side cooling fans are placed so that the cores come out sufficiently cooled to be unloaded with the bare hands. Cores are sorted into tote boxes placed on gravity conveyors. These conveyors may be given suitable locations on either side of the lower horizontal run of the oven conveyor. The plates and dryers are placed on racks, and are returned through the floor to the operators on the mezzanine floor.

This type of installation provides for every re-

The racks are suspended from these cross-rods by U-bolts, which provide for easy installation and removal. The absence of sprockets on the mezzanine floor is an additional safety feature in this design.

This arrangement may be employed with excellent results for large cores as well as small ones. This is due to the fact that a cooling chamber can be included in the horizontal run, up to the point of unloading.

#### Pasting, Drying and Blacking Ovens

Ovens required for pasting, drying and blacking usually are very small, due to the speed of the conveyor. Twenty to 30 min. cover the ordinary time required for these operations. The units are usually of such a height that they may be moved from one location to another in the foundry, if occasion demands. This feature has been valuable in several instances of rapid expansion in different plants.

# Proper Testing of Cast Iron

Author of British Exchange Paper Gives Opinion on Test Bars—  
Frenchman Favors Shear Test—American Discusses  
Effects of Coke on Castings

A NOTABLE session on gray iron metallurgy was held during the annual meeting of the American Foundrymen's Association in Cleveland, May 12 to 16. This was characterized as an international meeting by the chairman, H. Bornstein, Deere & Co., Moline, Ill., because the United States, England and France were represented in the authorship of the three scheduled papers, the two foreign papers being exchange papers of the English and French foundrymen's associations. That this meeting attracted great interest was indicated by the large attendance.

## *How to Correlate Tests for Cast Iron*

"CORRELATION of Tests for Cast Iron" was the subject of a paper by J. G. Pearce, director, British Cast Iron Research Association, Birmingham, England.

Dr. Pearce outlined some of the more important parts of his paper. The problem of adequate tests for cast iron, he said, is perhaps the greatest problem the foundry metallurgist has to face. His paper dealt mainly with the mechanical tests usually specified by the buyer and with the translation, as far as practical, from one form of mechanical test to another. He pointed out that correlation of tests is calculated to reduce the time and expense involved in testing and to promote standardization of testing procedures, and should help to convince the engineering designer of economies that can be effected by rational design of castings and by full cooperation between designer, foundry engineer and metallurgist.

The need of a high factor of safety in cast iron design, he said, arises not only from unexpected stresses, but

from uncertainty because of lack of relationship between test bar and casting. England in 1928 adopted a round test bar as the standard, this being in three sizes for different sized castings, and specified both tensile and transverse tests. Attempts are being made to connect these tests so that two tests can be avoided.

## *Melting Conditions Influence Properties*

The speaker brought out that, as mechanical properties are governed by structure, melting conditions have an influence on the structure and on the properties of certain irons, in addition to composition and rate of cooling. Micrographs were shown of specimens made of the same composition with the same rate of cooling, one having the normal structure of pearlite and graphite and the other a structure of fine or super-cooled graphite and ferrite. The difference in structures was due to difference in melting conditions. These two types of structure present different combined carbon contents, mechanical properties and chilling tendencies.

Variations in melting conditions, due to various causes, influence the properties of the metal far more than minor differences in composition. The removal of the skin improves mechanical test results, but further removal of the stock diminishes them.

## *Transverse Test the Simplest, But Tensile Preferred*

Dr. Pearce referred to the transverse test as the simplest, cheapest and most generally used test for cast iron. As usually interpreted, however, results are often contrary to facts and prevent comparison between transverse and other stresses. The strength of a series of bars, cast from the same ladle, increases as the section diminishes



J. G. Pearce

MR. PEARCE delivered the exchange paper from the Institute of British Foundrymen and has been lecturing to various foundry groups during the past three weeks.

Mr. MacKenzie is very active in foundry matters and has delivered many papers before technical organizations here and abroad. He was one of the American delegates to the International Foundry Convention in England in June, 1929.



J. T. MacKenzie

and also varies with the silicon content. Bars cast under a variety of melting conditions show scatter to a considerable degree even for the same sections and silicon content.

The engineer prefers the tensile test to any other, said the author, because there is much accumulated experience in this test which, when properly conducted, is reliable. These tests show the same relation between strength and size as transverse tests. The new British specification for testing cast iron does not call for chemical analysis.

In his conclusions Dr. Pearce declared that the proper correlation of mechanical tests necessitates the use of standard test bars and standard test procedures, preferably on an international basis. The 1.2-in. diameter bar, representing a large proportion of castings, is particularly suited for experimental work. Transverse, tensile and compression tests measure the same basic property of cast iron and, for standardized tests on the same size of bar, bear a constant ratio to each other for the same iron melted under the same conditions.

#### Casting Not Judged by Test Bar

Dr. Richard Moldenke, in the discussion, declared that a very small test bar is unsatisfactory, as was shown by experiences with the ½-in. Keep bar. In case a test bar is white he favored a large one; and this might be provided in a subclause in the specifications. One should not attempt to judge a casting by a test bar, but should judge the quality of the iron by the test bar, because of the stress that is likely to exist in a casting. James T. MacKenzie said that the English test bar is now meeting with favor in this country, but he thought the span should be lengthened on the larger bars in order to show deflections. He did not see why the specifications should eliminate rumble when most castings are rumbled. He did not consider the British impact test as good as the American drop test.

Dr. Pearce remarked that better small test bars can be made than formerly, and this might overcome some of the objection to the use of the small bars. In reply to a question, he said that a test bar should receive the same heat treatment as the casting and should be molded in the same sand, green or dry, that is used for the casting. If mechanical tests are used, he objected to the foundrymen's hands being tied with chemical tests.

#### Coke and the Properties of Cast Iron

A COMPREHENSIVE paper, including numerous charts and tables, on "Carbon and Sulphur in the Cupola—Some Properties of Coke," was presented by James T. MacKenzie, metallurgist, American Cast Iron Pipe Co., Birmingham. The author gave the results of a series of tests that were made with different brands of coke, with charges made up of various grades of pig iron, steel and iron scrap and ferroalloys, efforts being made to have only one variable under each set of conditions. The data tabulated for the charges covered the percentages of carbon, silicon, manganese and sulphur, Brinell hardness, chill depth, temperature and blast variations, modulus of rupture and modulus of elasticity. Some of the conclusions drawn from the tests were as follows:

Different cokes have a considerable influence on the carbon of the molten iron. While the ash content is a large factor, differences of 3 or 4 per cent ash can be overshadowed by differences in the burning rate or other characteristics of the coke. For ordinary cokes the higher the temperature, the lower the carbon equilibrium point. Some cokes do not give the same carbon, irrespective of the original carbon content for the number of melts tried. Sulphur increases with the sulphur of the coke, all other things being equal. Manganese has a strong influence on the sulphur, especially around a critical point. The manganese-sulphur product tends to remain constant with a given coke. It is raised by ferromanganese additions and increases with the temperature. Carbon and sulphur are

mutually repellant. A high-sulphur iron is difficult to carburize and a low-carbon iron absorbs sulphur readily. A coke that gives low carbon gives a higher sulphur absorption than one of the same sulphur content that gives high carbon. The burning test seems a promising method for the evaluation of coke.

#### Discussion

Dr. Moldenke was asked to discuss this paper but declined for the reason that it was not preprinted in time to give him an opportunity to study it. He remarked, however, that he would like to see the tests made in an 18-in. cupola repeated in a 54-in. cupola. The chair requested that written discussions be submitted later, in view of the fact that the preprinted copies were not available in time for study.

In reply to a question from the chair that he explain "what it all means," Mr. MacKenzie stated that the purpose of the tests was to determine the values of different kinds of coke for melting iron for castings that would have easy machinability. The data would be of help to foundrymen in finding the coke he needs and would be of assistance to the coke producer in furnishing coke that would best meet the customer's requirements. Carbon, he said, can be reduced by using the right coke, and sulphur can be reduced by the addition of sufficient manganese.

#### A Paper from France on Production Control

"SIMPLIFIED Methods for Controlling the Production of Cast Iron" was the subject of the French exchange paper prepared by L. F. C. Girardier, Saint Die, Vosges, France. This was an exchange paper of the Association Technique de Fonderie (French Foundry Technical Association). This paper, however, was not received in time to be preprinted and a brief abstract of it was given by J. W. Bolton, Lunkenheimer Co., Cincinnati. The writer stated that the quality of iron in the ladle is not sufficient to determine the quality of iron in the casting.

The shear test, in his opinion, is the best practical test for cast iron. Methods of supplementing the shear test were mentioned. The author also described a rating scale that he has devised for classifying samples and also gave details of a ball test for hardness, which is a modification of the Brinell test.

#### Choose Electroplate According to Service Required

A LARGE number of specimens of steel, brass, bronze and copper were plated by L. Davies in the laboratory of Metropolitan-Vickers Electric Co., Manchester, England, and the corrosion resistance reported to the last meeting of the British Institute of Metals in a paper "Protective Value of Some Electro-Deposited Coatings."

The specimens were plated with cadmium, zinc, nickel and chromium of thicknesses 0.0001 in., 0.0005 in., 0.001 in. and 0.002 in., and were subsequently exposed to accelerated corrosion. The author discussed the production of deposits of a thickness frequently specified or recommended, and their comparative behavior to corrosion sprays of salt and sulphuric acid. Under the conditions outlined, cadmium afforded better protection than zinc against the sulphuric acid spray. Against the salt spray, the thinnest deposits of zinc gave better protection than the corresponding cadmium deposits.

In general, for equal thicknesses of zinc and cadmium, the intrinsic protection afforded by the zinc more than compensates for its higher solution potential. Chromium deposits afforded no protection whatever to steel, but very good protection was afforded to the non-ferrous metals. A deposit of 0.002 in. nickel was found necessary to give any degree of permanent protection to steel. For general purposes, nickel deposits appear to be most suitable, but no deposit can be recommended unless the service conditions are known.

# Large Economies Possible Through Use of Waste Heat

BY CHARLES W. E. CLARKE\*

**F**UEL cost is one of the most important items in the expense of processing iron ore into steel. It is the purpose of this paper to show practical possibilities in the conservation of fuel through the efficient use of waste heat. The term waste heat is intended to include any heat existing as a by-product or surplus that is not used in the process in which it originates. The problem of more efficient waste heat utilization in an existing steel mill requires reconsideration of all fuel and heat uses.

Three sources of waste heat are ordinarily of sufficient importance for practical consideration: The by-product coke plant, the blast furnace and the open-hearth furnace. The quantities of by-product energy available from all but the open-hearth furnace are influenced by the amount of coke used in the blast furnace per ton of pig iron produced. The following table shows the quantities in B.t.u. per ton of pig iron which might be expected in average practice:

	Coke Rate, 1500 Lb.	Coke Rate, 2800 Lb.
Coke oven gas.....	3,370,000	6,300,000
Coke breeze.....	1,435,000	2,680,000
Coke oven tar.....	1,400,000	2,700,000
Blast furnace gas.....	6,600,000	16,800,000
Open-hearth waste heat.....	2,670,000	2,670,000
Total, B.t.u.....	15,475,000	31,150,000

Utilizing this waste heat requires its substitution for coal or other purchased fuel wherever it is practical to do so. Open-hearth waste heat and coke breeze are limited in their use to the generation of steam. Blast furnace and coke oven gas, either straight or mixed, are suitable as fuels for practically any of the various thermal processes of the steel industry, the problem being to allocate them in the manner that will produce the best overall economy.

The qualities of the two gases are quite different.

\*Consulting engineer, United Engineers & Constructors, Inc., Philadelphia. Abstract of paper read before American Iron and Steel Institute at New York, May 9.

Blast furnace gas has a heat value of from 90 to 110 B.t.u. per cubic foot and the combustible matter is mainly carbon monoxide. It has a theoretical flame temperature of about 2800 deg. Fahr., but when burned with the amount of air necessary for proper combustion will not ordinarily produce a flame temperature of more than about 2400 deg.

Coke oven gas has a net heat value of about 510 to 525 B.t.u. per cubic foot and the combustible matter is mainly hydrogen and methane. The theoretical flame temperature is 3600 deg. Fahr., or higher, but with the proper air supply will produce a temperature of about 3200 deg.

By mixing the two in various proportions a gas can be obtained having any desired heat content from that of straight blast furnace gas as a minimum to that of straight coke oven gas as a maximum. Equipment is available for mixing and automatically controlling the quality of mixed gases. The illustration shows the proportions of the two gases required to give a resulting mixture of any heat value between the two extremes, and the corresponding theoretical flame temperature.

The following table shows heat values in B.t.u. per cubic foot suitable for various steel mill processes:

Open-hearth furnaces.....	130 to 300
Soaking pits .....	90 to 130
Reheating furnaces.....	130 to 325

Furnace and other heating equipment designed for coke oven gas, producer gas or fuel oil often requires considerable modification if a mixture of blast furnace and coke oven gas is to be used. In some cases it may be possible to use a mixture which is perhaps not ideal for the process, but which will be satisfactory and will not require changes to furnace or regenerators.

The heat requirement for finishing steel is affected by the size of the final product. In mills producing relatively large sections, such as rails and structural shapes, the



C. W. E. Clarke

**B**ORN in Chicago in 1882 and educated in the public schools of that city, C. W. E. Clarke was a draftsman in his early career and later became assistant to the chief engineer of Sargent & Lundy, Chicago. From 1910 to 1918 he was a mechanical engineer for Stone & Webster, Boston. He served in France during the war in connection with the power supply for the American ordnance base, and in 1918 became associated with Dwight P. Robinson & Co., Inc., as chief of the power engineering division. He is now consulting engineer of the United Engineers & Constructors, Inc., Philadelphia. He has contributed papers to various technical societies. He has had responsible charge of refrigeration and power installations for Armour & Co. and of power plants of many of the largest companies in the country.

rolling may be completed with the initial (soaking pit) heat. In mills working down to rods or sheets there will always be one and occasionally two reheats, subsequent to the soaking pit heat. However, these reheats require a relatively small quantity of heat as compared with the total amount of heat required in the open-hearth and soaking pits. In general practice the heat requirement in fuel fed to the furnaces is approximately as follows:

	B.t.u. per Ton, Ingots	B.t.u. per Ton, Pig Iron
Open-hearth furnaces.....	6,000,000	10,000,000
Soaking pits .....	1,300,000	2,170,000
Reheating furnaces.....	1,390,000	2,320,000

The growing tendency to take full advantage of the by-product energy available in the steel industry by the methods outlined herein brings into prominence the desirability of considering really high-efficiency equipment for power production. In many plants the steam and electric power demands are of a magnitude comparable with those of the public utility central stations. Central station types of equipment and design, are, therefore, justified for steel mill power plants. Modern central power stations of moderate size operate with total heat consumptions averaging in the neighborhood of 15,000 to 16,000 B.t.u. per kilowatt-hour, and under favorable conditions even better rates can be secured.

In any system, such as has been discussed here, which is designed for the purpose of securing the most economical return, considering both capital and operating costs, there will be times when the by-product fuel supply exceeds the demand. Because of this condition it cannot be assumed that all of the by-product fuel can be used, unless an outlet external to the steel mill is provided. In some cases it has been possible to consummate a power interchange agreement with the local public utility, under which power may be purchased when the load exceeds the capacity of the fuel supply, and sold when excess fuel is available.

In a plant where only the first step in an extended plan of electrification has been carried out, and most of the rolling mills were still steam-driven during the period covered, the saving accomplished by more efficient generation of electrical energy, blast furnace blowing and use of blast furnace gas is indicated by the following figures:

	Before Im- provements Were Started	After Im- provements Were in Operation
Approximate tons of steam coal used per day.....	820	450

Total heat requirements per ton of pig iron, exclusive of coke plant fuel requirements and hot blast stoves, is on the average about as follows:

	B.t.u. per Ton Pig Iron
Blast furnace blowing.....	1,400,000
Open-hearth .....	10,000,000
Soaking pits.....	2,170,000
Reheating furnaces.....	2,320,000
Power .....	3,410,000
Miscellaneous .....	2,000,000
Waste and lack of coordination of sup- ply and demand assumed.....	2,700,000
	24,000,000

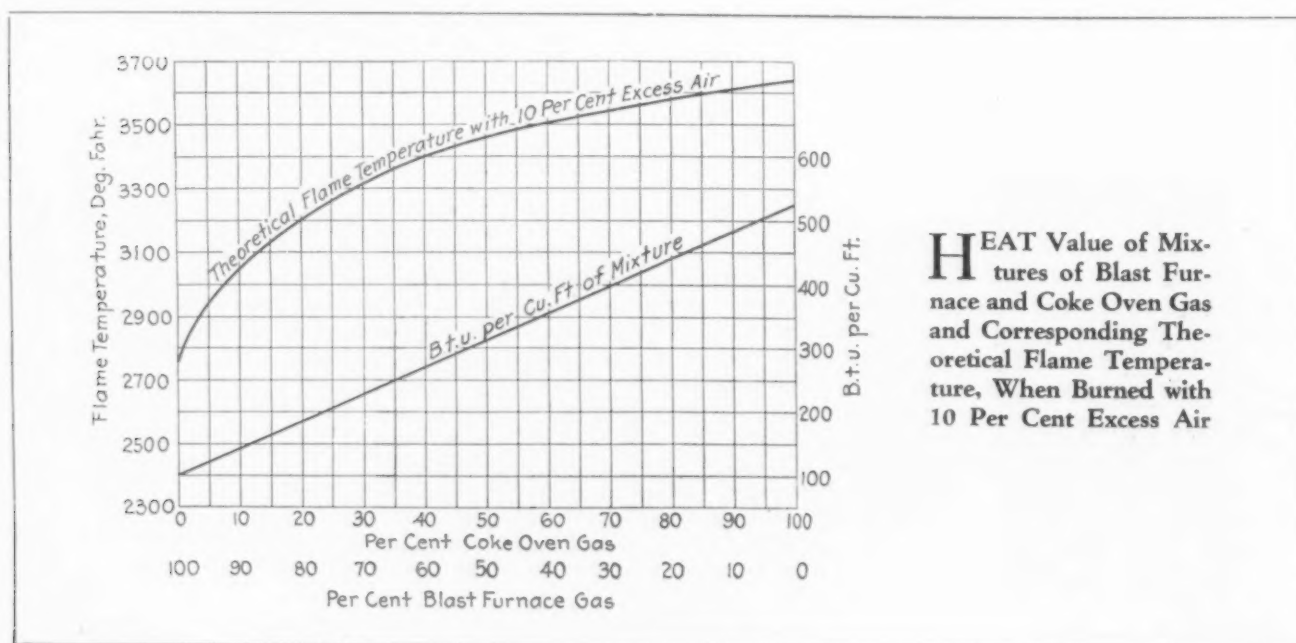
To supply this requirement there is available, as indicated above 15.5 to 31 million B.t.u. per ton of pig iron, the amount depending upon the blast furnace coke rate. Average coke consumption in 1927 per ton of pig iron produced in the United States was 2122.3 lb. For this coke rate the heat available would be about 21,000,000 B.t.u. per ton of pig iron.

It is apparent from the above that, for average conditions in a mill designed and operated with the idea of utilizing waste heat to as great an extent as economic considerations will allow, it should be necessary to burn but a relatively small amount of coal or other purchased fuel except in the coke plant.

### Heat Balance and Fuel Requirements

LEADING the discussion on Mr. Clarke's paper, Walter N. Flanagan, special engineer, Carnegie Steel Co., stated that the keynote of waste-heat utilization and the greatest problem involved in the fuel distribution system of any steel works is to meet and care for peaks, surpluses and deficiencies. In a steel works, including the necessary coke plant, there are two sets of fuel distributions to be handled—metallurgical fuel and fuel for power requirements. Peaks in metallurgical fuel requirements, when utilizing by-product or waste heat, may be met by the following methods, among others:

- (1) By varying the percentage of tar used. (Very feasible.)
- (2) By use of gas holders as regulators. (Requires high initial investment.)
- (3) By variation of the mixture of blast furnace gas used. (Not recommended, on account of variation in fuel quality.)
- (4) By the storage of week-end surplus. (Gas holders are a question, on account of extremely



**H** EAT Value of Mix-  
tures of Blast Fur-  
nace and Coke Oven Gas  
and Corresponding The-  
oretical Flame Tempera-  
ture, When Burned with  
10 Per Cent Excess Air

high initial expense. One company is preparing to utilize abandoned natural gas fields for storage of week-end coke oven gas. This stored gas will be used as needed during mill operating days.)

- (5) By use of blast furnace stoves as heat storage reservoirs.

Peaks in steam or power requirements may be met:

- (1) By varying rate of firing of solid fuel boilers.
- (2) By tying in with a public utility company.
- (3) By regulating the quantity of fuel fed to the blast furnace stoves, using these units as heat storage reservoirs.

Study of two heat balances for 6000 tons of ingots a day at a plant, the capacity and unit fuel consumptions of which are in Table I, indicates that the fuel quantities lie within the range of 4800 to 3200 lb. of coal per ton of pig iron, processed into finished steel.

Assuming reasonably modern conditions, such as blast furnace turbo-blowers, engine-driven blooming and roughing mills, and motor-driven finishing mills, and that all steel is rerolled to an average range of bar or merchant mill shapes, then with waste-heat boilers installed at all open-hearth furnaces, the fuel consumption would total about 4110 lb. of coal. At an average cost, this means an expenditure for fuel of about \$1,000,000 a year for 1000 tons of ingots a day.

With reasonable additional economies effected, as will be discussed later, the total fuel consumption will be reduced to 3625 lb.

#### To Speed Up Open-Hearth Furnaces or Use Waste Heat?

Under average operation a considerable percentage of the fuel supplied to the open-hearth furnaces is available as waste heat, either to obtain much higher regeneration, and therefore greater efficiency of the furnaces proper, or in the production of power by means of waste-heat boilers. Making each furnace a unit of high efficiency without the seeming complication of waste-heat boilers is ideal. Still, until refractories and general design of furnaces have been developed to this stage, the average plant will continue to waste a large quantity of heat, unless this is utilized by some external accessory, such as boilers.

A specially designed waste-heat boiler installation, consisting of a fire-tube boiler, with possibly an economizer in series, has been proved to return in the shape of steam, almost one-third of the fuel entering the open-hearth furnaces. Mr. Clarke has justly stated that a disadvantage of open-hearth waste-heat boilers is their inability to assist with peaks.

#### How Heat Can Be Utilized

To illustrate the waste-heat situation in the plant fuel balance, as well as the proposed method of meeting fuel

Table I—Production, Consumption and Miscellaneous Data		
Production	Daily	
Open-hearth ingots .....	6,000	gross tons
Bessemer ingots.....	0	gross tons
Blooms .....	5,000	gross tons
Billets, etc., for rerolling.....	4,740	gross tons
Finished bars, etc.....	4,200	gross tons
Blast furnace output.....	3,100	gross tons
Coke plant, coal charged.....	5,100	net tons
Blast furnace coke.....	3,100	net tons
Domestic coke .....	174	net tons
Coke breeze .....	331	net tons
Coke oven gas (cu. ft. per ton of coal charged) .....	12,000	
Tar (gal. per ton of coal charged).....	10	
Fuel Consumption		
Blast furnace coke (per gross ton of iron)	2,000	lb.
Open-hearth (per gross ton of ingots)...	6,750,000	B.t.u.
Pit furnaces (per gross ton of ingots)...	900,000	B.t.u.
Reheating furnaces (per gross ton of ingots) .....	2,315,000	B.t.u.
Boiler house efficiency (based upon net output) .....	70%	
Blast furnace stove consumption (58% efficiency) .....	30%	of gas produced

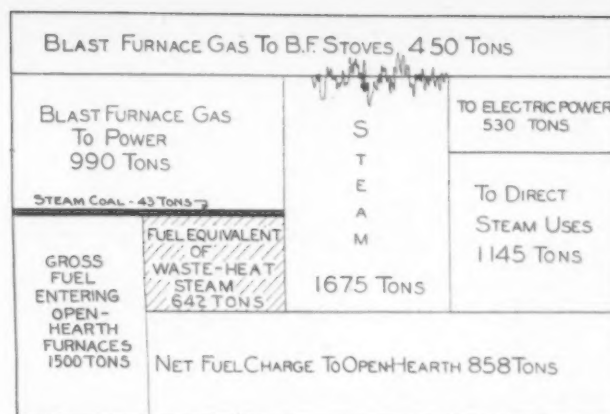


FIG. 1—Fuel Peak Control by Blast Furnace Stove Regulation in Plant of Average Efficiency

peaks by blast furnace stove regulation, Fig. 1 was prepared. Here, reduced to net tons of equivalent coal and plotted to scale, are shown the fuel to the blast furnace stoves, to power, and to the open-hearth furnaces, for the plant of Table I. For the average load little steam coal is required; not enough to justify the operation of coal-fired boilers.

Return of open-hearth waste heat is based upon a 30 per cent steam recovery, divided by 70 per cent direct-fired boiler efficiency, or  $\frac{0.30 \times 1500 \text{ tons}}{0.70} = 642 \text{ tons}$ .

In Fig. 1 has been superimposed at the top of the total steam band (including that to electric power) the actual peak steam demand curve for a large plant of about the stated capacity. The curve has been converted to net tons of coal and plotted to the same scale as the rest of the diagram. This shows the feasibility of using the blast furnace stoves as a heat storage for the meeting of fuel peaks.

#### Making the Stoves Do Double Duty

By increasing the capacity of the hot blast stoves instead of installing additional boiler capacity, the stoves may be regulated to meet the peaks in power fuel demand and still perform their original function of supplying hot blast to the furnaces. The plant so arranged would require only the installation of combined pulverized coal firing at a few of the blast furnace gas-fired boilers, to meet extreme conditions and possible periods of low operation. The stoves would then act in the combined capacity of heat storage reservoirs and blast heaters.

The practice of checking stoves to meet peaks in fuel demand is not new. It has been in use for at least 20 years to insure the necessary fuel supply to blast furnace gas engines. That it is feasible is indicated by Fig. 1. The stove installation will require increased burner and heat absorbing capacity, and additional work by the stove tenders. This, however, would be overbalanced by a saving in boiler house labor.

#### Capital Requirements

Some idea of the investment economies may be obtained from the following calculations:

The range of fluctuations shown by the superimposed peak curve in Fig. 1 amounts to 405 net tons of coal a day.

405 net tons coal at 70 per cent efficiency is equivalent to approximately 9530 boiler horsepower output.

Assuming 250 per cent variation in boiler rating, and 80 per cent of the boilers in service, this would require  $\frac{9530}{2.50 \times 0.80} = 4750$  boiler horse-

BLAST FURNACE GAS TO B.F. STOVES 375 TONS			
BLAST FURNACE GAS TO POWER 866 TONS		S T 1342 E TONS A M	TO ELECTRIC POWER 812 TONS
			TO DIRECT STEAM CONSUMERS 530 TONS
GROSS FUEL ENTERING OPEN- HEARTH FURNACES 1108 TONS	EQUIVALENT FUEL RECOVERED IN WASTE-HEAT STEAM 476 TONS		
	NET FUEL CHARGE TO OPEN-HEARTH 632 TONS		

**FIG. 2—Control of Fuel Peak, in Plant with Higher Fuel Economies, by Blast Furnace Stove Regulation**

power additional capacity to be installed.

At \$150 to \$175 for a boiler horsepower this would require a minimum investment of  $4750 \times \$150 = \$713,000$ .

The difference in the initial cost of stoves just to meet the furnace requirements for 3100 gross tons of pig iron a day, and of stoves to have sufficient heat storage capacity also to meet peaks, would be less than the above figure.

#### Changes with Higher Efficiency

In Fig. 2 are shown fuel conditions for the same plant as in Fig. 1, except that the attainment of additional economies has been assumed, that is:

Open-hearth requirements reduced to 5,000,000 B.t.u. per gross ton of ingots.

Pit furnaces, 700,000 B.t.u. per gross ton of ignots.

Reheating furnaces, 1,850,000 B.t.u. per gross ton of finished product. (High-efficiency or metallic recuperators installed.)

Blast furnace stove efficiency increased. (25 per cent of gas to stoves; about 68 per cent efficiency.)

Blooming mills and roughing mills motorized.

Miscellaneous motorization around blast furnaces, tops, etc.

Boiler house efficiency, 75 per cent.

#### Improvement Possible without Going Beyond Present Good Practice

Fig. 2 then illustrates conditions in a plant which would on the average require no steam coal, and would have an excess of blast furnace gas normally available for utilization as a metallurgical fuel. In the case of complete electrification of the plant transportation system, it would require no coal for locomotives, cranes, etc. Since, in the average plant, blast furnace gas is more valuable as a metallurgical fuel than as a boiler fuel, this utilization could be carried still further until all producer gas is wiped out, and the resulting power fuel deficiency made up by firing coal under the boilers.

Converted to tons of coal and plotted to scale, the peak steam curve from Fig. 1 has been superimposed upon the average line representing steam and electric power requirements of this plant. But it is likely, with complete motorization of such a plant, that these peaks would be diminished. It indicates, however, the feasibility of utilizing the blast furnace stoves as a means of regulating any ordinary peak demand.

#### Getting the Most Out of Blast Furnace Gas

There is also the possibility, as can be observed from the width of the band indicating blast furnace stove demand, in Figs. 1 and 2, of utilizing stove regulation to meet peaks in the metallurgical fuel demand, also where the blast furnace gas is used as such a fuel.

Consideration of by-products and peaks is a matter of economics. It will be necessary, as usual, to make a careful survey of the conditions in each individual plant, to decide how the peaks shall be handled, and whether waste-heat boilers, increased regeneration, or a completely modified design of open-hearth furnaces shall be used.

### Unique Welding Process a By-Product of Pure Research



OPERATOR at Work in the Schenectady Plant of the General Electric Co. With the Atomic Hydrogen Arc. This form of electric welding, a comparatively recent development, is of value where a weld of great ductility is desired. It may be used for welding thin or heavy material, as well as some metals and alloys hitherto considered unweldable

# Apprentice Training—A Growing Need

Increasing Complexity of Industry Is Forcing Introduction of  
Systematic Instruction—General Electric Plan a Success



THE keynote of the apprentice training meeting at the convention of the American Foundrymen's Association in Cleveland, May 12 to 16, was struck by S. Wells Utley, vice-president and manager, Detroit Steel Casting Co., when he said that a trained personnel is essential in every industry. Self-trained men have successfully operated old-fashioned foundries

in days gone by, but the very complexity of our modern equipment, and the multiplicity of our requirements call for a training unknown in former times.

## Need for High-Grade Men Greater Than Ever

MODERN methods of manufacturing have substituted machines for hand skill in many operations. At the same time high-grade mechanics are required to supervise and lead, and the need for such high-grade men is greater now than at any time in the past.

To be successful in the work of training apprentices, a company must organize on the same principle that it organizes to buy its raw materials, to develop its cost figures or to handle metallurgical research problems.

Discussion of Mr. Utley's paper raised the question of the cost of apprentice training. The experience of the Falk Corporation, Milwaukee, based on a thorough study of shop production costs, is that the work of apprentices actually shows a profit, even when all incidental charges are taken into account.

## General Electric Co. Rapidly Absorbs Apprentices

SINCE 1902 the Lynn Works of the General Electric Co. has graduated 1167 apprentices, and 50 per cent of them are still with the company. From these graduates, said E. H. Ballard, superintendent of pattern shop and foundries, Lynn Works, there have been developed three managers, 28 engineers, eight superintendents, eight supervisors in industrial training and 40 graduates teaching in public schools and colleges throughout the country. The company's plants are absorbing the apprentices as fast as they are being graduated.

During the discussion it was stated that British foundrymen are concentrating on educational improvement of older workers as a step toward immediate improvement in foundries. The General Electric Co.

also offers educational and training opportunities to older workers in the trades and in office work. The names of those completing courses are carded for use when desired opportunities occur.

## Policy of the American Steel Foundries

IT was the early experience of the American Steel Foundries that less than 10 per cent of the men trained remained with the company. The plan of operation was changed so that now only a few college-educated men are carefully selected, the number being held down so that each man completing the course can be offered a responsible position. This company also operates foremen's training courses and offers apprentice training courses for the development of journeymen.

Two years of operation of the East Chicago community training program have been marked by very satisfactory progress. Cooperation between the schools and local industries has been most effective. Turnover occurs almost wholly during the probationary period. The courses, as now operated, extend over periods of three and one-half and four years, the students spending one-half day a week in school for 11 months out of each year.

## Two Questions Answered

TWO questions were answered by charts prepared from figures compiled by the Industrial Commission of Wisconsin. One question was "Why do some apprentice training programs fail?" The answers, in the order of their importance, were as follows:

- 1.—Proper application of apprentice principle not understood.
- 2.—Poor selections of learners.
- 3.—Poor supervision.
- 4.—Selfishness (expect more production than commensurate with wages paid).
- 5.—Heads not in sympathy with the program.
- 6.—Unfavorable working conditions.
- 7.—Unfair adjustment of complaints and disputes.
- 8.—Promises unfulfilled.

The other question was, "Why do many employers fail to adopt systematic apprenticeship?" The answers, in order of importance, were:

- 1.—Lack of leadership.
- 2.—Value of organized training not appreciated.
- 3.—Employers not agreed on program.
- 4.—Unwillingness to assume responsibility toward learners.
- 5.—Fear of giving learners or competitors something for nothing.
- 6.—Indifference toward the future of the industry.
- 7.—Importance of human element in industry not appreciated.

# Operating a Manufacturing

**M**EANS by which a fair-sized industrial plant can operate an incinerator system to such effect as to get rid of any need to purchase fuel is said to be inherent in equipment designed by the Industrial Incinerator Engineering Co., Hartford, Conn. What is proposed is the use of an incinerator, with hot-gas passages close enough to the boiler plant so that the heat from these gases may be utilized in raising steam and for other purposes. The arrangement of this incinerator unit is shown in the diagrams.

At first thought the question of odors would come up strongly, particularly where garbage is to be a large portion of the fuel. This is said to be entirely taken care of, however, by the induced draft system shown by arrows in one diagram. By this means the odoriferous gases are drawn off, forced down into the combustion chamber and then, passing up through the grates, are ignited and burned. Municipal plants where this system has been put into use are reported to have no trouble from this source.

Dumping of refuse into the storage bin is facilitated by the curb either side of the hatchway, which requires the truck to take a prearranged position. Spillage is thus obviated and trouble at that point done away with. The door between charging platform and storage bin is raised by the charging operator whenever fuel is to go into the combustion chamber below. The material is raked out of the storage bin into the charging hopper and then dropped on to the grates.

A fire of considerable depth of fuel bed is maintained on the grates. This is possible because of the carrying away of the gases separately and the drainage of the free liquid by means of the gutter shown at the lower left corner of the storage bin. Thus what is charged on the fire is porous enough to permit ready passage through it of the air for combustion. Enough heat is applied to the bottom of the storage bin to expedite the taking off of the gases as shown.

## A Management Problem

Applied to the industrial problem, this question becomes a matter of management. Enough heat can be obtained from these refuse materials, when supplied in sufficient quantities, to furnish the heat requirements of many manufacturing plants. It has been found that each pound or ton of this material will, on the average, replace in effective heating value from 0.15 to 0.20 pound or ton of good bituminous coal. If the coal costs \$5 or \$6 a ton, the fuel value of the

refuse would be about \$1 a ton.

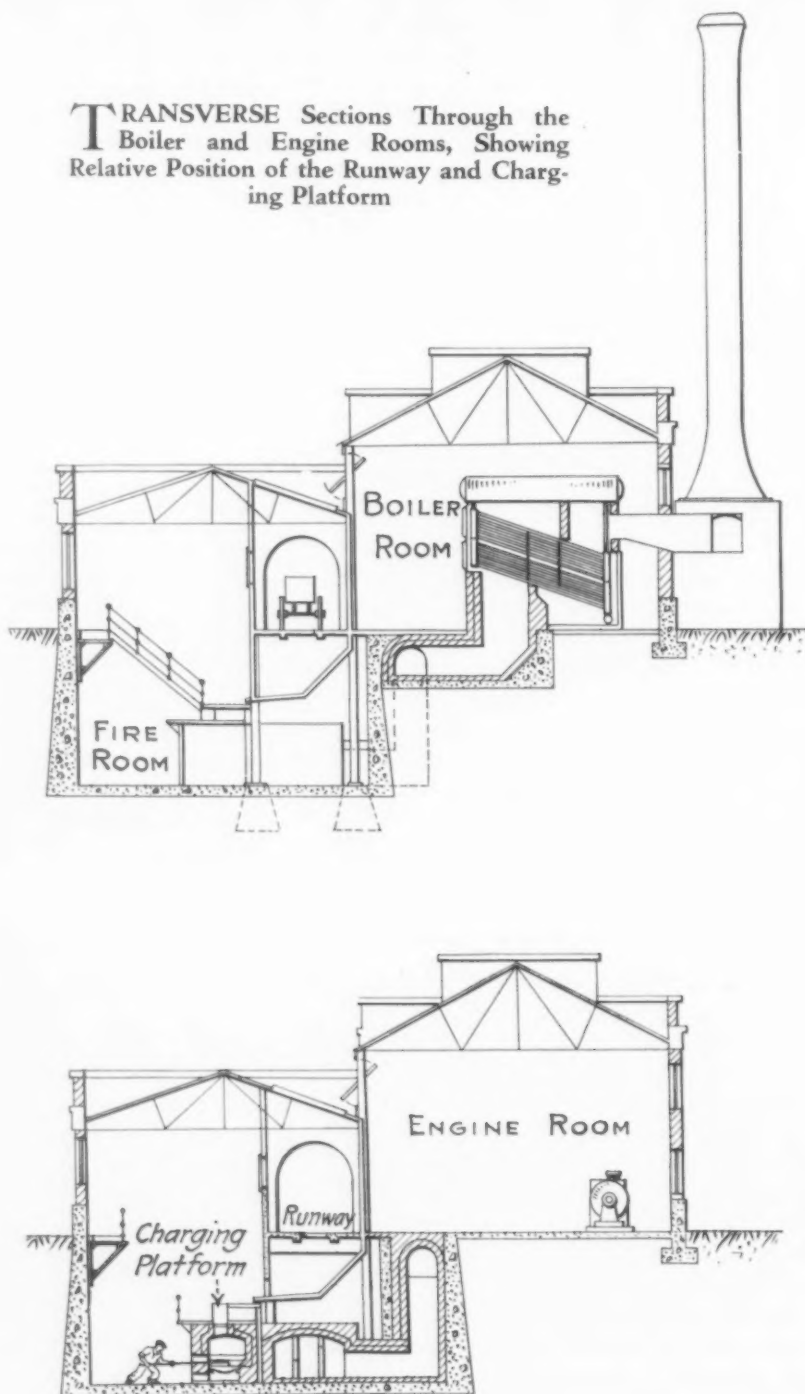
Municipalities, of course, are faced with a definite expense in getting rid of material of this sort. If arrangements can be made whereby the municipality could simply dispose of the material by dumping it into the storage bin at a manufacturing plant, two things would be accomplished: The community would be relieved of the expense of building and operating an incinerator plant; the industrial plant

would be saved the cost of the fuel thereby displaced.

## Flexibility Served in Design

Storage bin capacity is figured out as about the equivalent of four or five days' operation. Incinerator units are designed so that a single unit, or perhaps two of them, would serve a single boiler and the whole thing is worked out thus on the multiple system. Hence, flexibility is secured with

**T**RANSVERSE Sections Through the Boiler and Engine Rooms, Showing Relative Position of the Runway and Charging Platform



# Plant Without Fuel Cost

regard to rate of operation, covering the varying requirements of daytime and night-time, holidays, week-ends, etc., and the fuel is used as needed.

For tiding over a period of non-operation or light operation there would be no shut-down of the exhaust fan drawing the gases from the mass of material. These gases would be passed through the heating chamber and burned, even though the products of combustion might then be sent directly to the stack. This procedure would be necessary if odors are to be avoided. Usually, however, there will be enough need for a small amount of heat around the plant so

that even this quantity could be utilized and not entirely wasted.

Many industrial plants already operate incinerators to take care of their own refuse materials, including in a good many instances the garbage from their own cafeterias. This proposed system is merely an extension of that idea to a larger measure of operation and a greater community usefulness, besides the question of large saving in fuel costs.

## Storage Bin Is Strong Feature

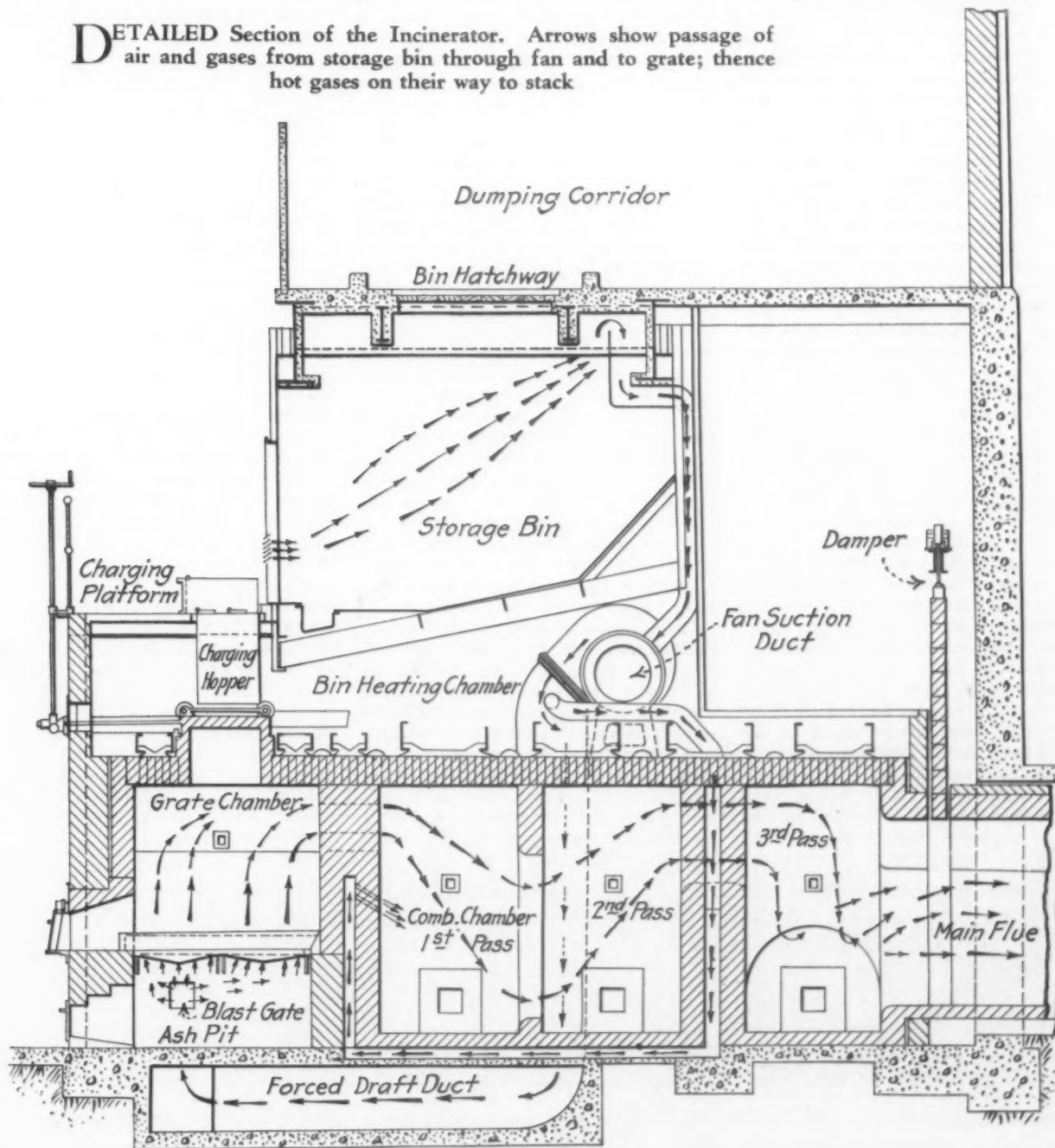
The heart of the whole system lies in the patented arrangement of the storage bin, the hot-air chamber un-

der it and the fan and duct system whereby the gases are driven off from the putrefying mass and utilized in the combustion chamber. This system is so interconnected that the air supplied for combustion, practically all of which passes through the storage bin, when heated and well mixed with gaseous fuel, reaches the grate chamber through a blast gate beneath the grates.

Carbohydrates remaining in the refuse, or carried as vapor in the hot air thus supplied to the furnace, are a valuable aid in efficient combustion. A large variety of alcohols, ethers, etc., together with ammonia, are

(Concluded on Page 1728)

**D**ETAILED Section of the Incinerator. Arrows show passage of air and gases from storage bin through fan and to grate; thence hot gases on their way to stack





# Dividends Five Dollars Out of Nine

Remaining 44 Per Cent of Earnings Goes Back Into Business—  
Seven Years' Experience of 104 Companies

OF every nine dollars earned on common stock by metal-working companies, five dollars are divided among stockholders and the remaining four dollars are plowed back into the business. That, at least, is the experience, during the past seven years, of 104 leading companies, including those dominating their respective branches of the field.

But the years, as they have passed successively into history, have witnessed changing conditions. And the different branches of the industry have not all pursued the same policy—at any rate, the conservatism shown by some has not been shared by all.

Steel companies have paid common stockholders only four dollars from each nine dollars earned. Non-ferrous companies and equipment and machinery makers, at the other end of the scale, have paid nearly six dollars. And the automotive, electrical and miscellaneous groups have occupied a middle ground.

Three years, 1927-1928-1929, have all seen between five and six dollars paid to the common stockholder out of each nine dollars earned. The four earlier years showed less generous provision for him, with 1923, earliest of all, accounting for only four dollars. The differences between maximum and minimum, year by year, have closely matched the variations from branch to branch of the industry.

Analysis of these 700-odd annual reports in the field covered by THE IRON AGE (only one company of the 104 is not a subscriber) was made to determine dividends on the common stock only. Preferred dividends being in the nature of an obligation second only to payment of interest on bonds,

the study was confined to the corporate action on the common stock issues.

In the original figures many interesting facts came out regarding individual companies. Some had a deficit, and not a net income, prior to common dividends. In some such cases no dividends were paid; in others they were paid at the same rate as in preceding years. In many cases, even when a net income was earned, no dividend was paid or a dividend far less than earnings might have justified.

In spite of these accidental conditions, so to speak, the general trend has been an increase in earnings through the period covered, amounting to more than a doubling since 1923, and a distribution of common dividends at a higher rate than was prevalent six or seven years ago. This means a higher proportion of earnings as well as a higher annual total.

These companies have been divided up somewhat arbitrarily into 18 steel companies, 16 automotive, 17 machinery, 14 equipment, 6 electrical, 13 non-ferrous, and 20 miscellaneous metal-working organizations. Study of these separate groups, both by means of the table and of the diagram, shows somewhat more divergent tendencies than might be expected.

Automotive companies distributed in 1929 about 69 per cent of their net income, and non-ferrous companies, 74 per cent. This is in contrast with the steel companies, which distributed only 38 per cent. Machinery makers distributed over 65 per cent; equipment makers, nearly 54 per cent; electrical manufacturers, about 62 per cent; and the miscellaneous metal-working group, 61 per cent. The aver-

age for the year was just under 60 per cent.

Amounts involved in 1929, among the 104 companies, were \$1,321,500,000 earnings before common dividends and \$789,700,000 distributed to holders of common stock. The first figure is 2.39 times that of 1923; the second, 3.11 times. In the seven years earnings on common stock were \$5,818,200,000 and common stock dividends amounted to \$3,312,400,000.

## Bulk of Furniture Still Is Made of Wood

WASHINGTON, June 3.—In spite of the inroads of steel furniture, more than 90 per cent of all household furniture is of wood and more than 67 per cent of all office furniture is of wood, according to Dr. Wilson Compton, secretary and manager, National Lumber Manufacturers' Association. The statement was made in the course of a recent lecture on "Economic Aspects of the American Lumber Industry" before the Wharton School of Finance and Commerce, University of Pennsylvania.

Steel, he said, is pushing its way into the furniture field and into all forms of interior finish, "so that you often can not touch wood in a railroad car or an automobile and you have to hunt for it in the modern office building. Steel panels and the various wall boards and floor compositions are imitating lumber both in appearance and in such other qualities as insulation and resiliency, and prepared roofings on a large scale are supplanting shingles."

HOW METAL-WORKING INDUSTRIES DISTRIBUTED EARNINGS IN SEVEN YEARS				DISTRIBUTION ANNUALLY OF EARNINGS OF 104 COMPANIES			
Millions of Dollars in Seven Years	Earned on Common Stock	Common Dividends Paid	Per Cent Paid	Millions of Dollars	Earned on Common Stock	Common Dividends Paid	Per Cent Paid
18 Steel companies.....	1,074.5	474.5	44.2	1923 .....	552.1	253.7	46.0
16 Automotive companies...	1,796.5	1,052.7	58.6	1924 .....	481.5	270.1	56.1
17 Machinery companies....	463.4	291.0	62.8	1925 .....	692.6	354.3	51.2
14 Equipment companies....	451.9	282.7	62.6	1926 .....	863.4	465.2	53.9
6 Electrical companies.....	600.2	341.9	56.9	1927 .....	856.3	544.1	63.5
13 Non-ferrous companies..	614.1	395.5	64.4	1928 .....	1,050.8	636.0	60.5
20 Miscellaneous companies.	818.6	474.1	57.9	1929 .....	1,321.5	789.7	59.8
Total .....	5,818.2	3,312.4	56.9	Seven years....	5,818.2	3,312.4	56.9

# Crane Built of Strong Aluminum Alloy

Unit of 10 Tons Capacity Saves 12 Tons From Weight  
of Steel Traveling Crane

BY F. V. HARTMAN AND E. F. HARTMAN\*

**A** NEW application of the strong alloys of aluminum in the field of structural engineering is found in the 10-ton traveling crane in the new structural mill of the United States Aluminum Co., Massena, N. Y. While there have been numerous other examples of aluminum structures in the past, such as motor truck bodies, large shipping and storage containers, railroad cars, etc., this is the largest structural application today, with the exception of the framework for lighter-than-air craft.

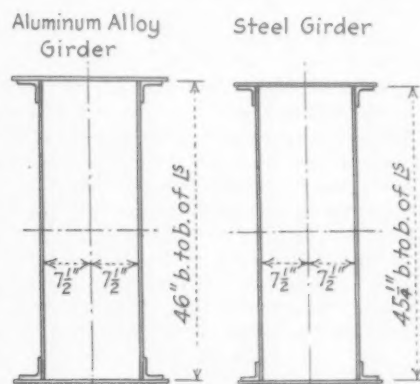
Briefly described, the aluminum alloy crane is a 3-motor, single-hook machine with a lift of 22 ft. The bridge is fabricated from two double-web girders spaced 7 ft. on centers. The girders are constructed of strong aluminum alloys, and have a span of 72 ft. 2 in. Aluminum was used also in the walkway, handrails and operator's cage. The bridge girders frame into cast steel carriages at their ends, and a one-piece cast steel trolley carrying the hoisting mechanism is mounted on the girder rails.

The design of the crane was based largely upon the usual practice followed in building steel cranes. But certain departures were necessary in the case of the bridge girders, since aluminum and steel differ in some of their mechanical properties. While the strength of structural steel and of the heat-treated strong aluminum alloys is approximately the same, the modulus of elasticity of aluminum is only about one-third that of steel.

## Larger Girder Sections Used

Because of this difference in the modulus of elasticity, an aluminum

girder, having a cross-section identical with that of a steel girder, would deflect about three times as much under load and have less lateral stiffness. Hence, it was necessary to construct the aluminum alloy girders with sections somewhat deeper, wider, and of greater sectional area. In addition, the girders were given approximately twice as much camber as is ordinarily used in a similar steel girder.



Comparative Cross-Sections at Center of Span for the Steel and Aluminum Alloy Girders for 10-Ton Cranes

	Aluminum Alloy	Steel Girder
Web plates....	46x $\frac{1}{2}$ in.	45 $\frac{1}{4}$ x $\frac{1}{2}$ in.
Flange angles...3 $\frac{1}{2}$ x3 $\frac{1}{2}$ x $\frac{1}{2}$ in.		3x3x $\frac{3}{4}$ in.
Cover plates....	24x $\frac{3}{4}$ in.	22x $\frac{3}{4}$ in.

The aluminum alloy crane was built by the Alliance Machine Co., Alliance, Ohio. Although this company has had no previous experience with aluminum alloys, it encountered no fabrication difficulties. The web and cover plates were flattened and sheared on the same equipment ordinarily used in the construction of steel girders. The rivet holes were sub-punched and

then reamed to size in the usual manner.

Hot steel rivets,  $\frac{3}{4}$  in. in diameter, were used throughout. They were driven mostly with air-operated squeeze riveters, some of the more inaccessible ones being driven with pneumatic hammers. No difficulty was experienced in riveting the girders, although a few special precautions were taken.

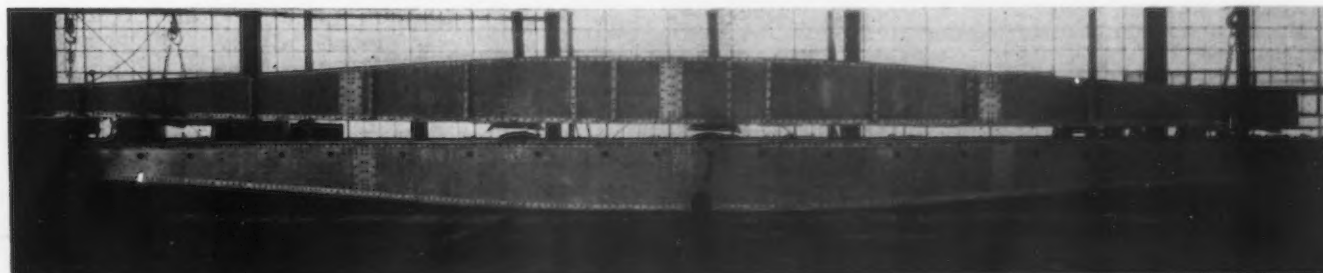
Excessive rivet temperatures were avoided, to decrease the possibility of heating the aluminum plates sufficiently to draw their temper. And the rivets were driven at random during assembly of the box girders—not to concentrate the heating effect of the rivets and to help in keeping the girder straight during riveting.

It was necessary to use more splices in the aluminum alloy girders than are usually found in steel girders, as longer plates and angles were not available at the time the crane was fabricated. Aluminum alloys were not used for the end trucks and trolleys, because the urgent need for this crane did not allow sufficient time to redesign and cast these parts in aluminum.

## Comparison with Steel Crane Made Possible

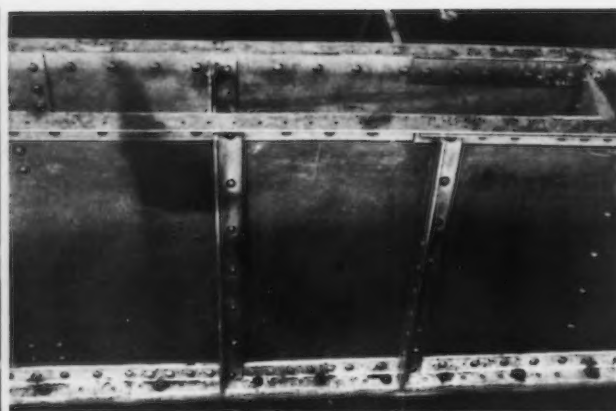
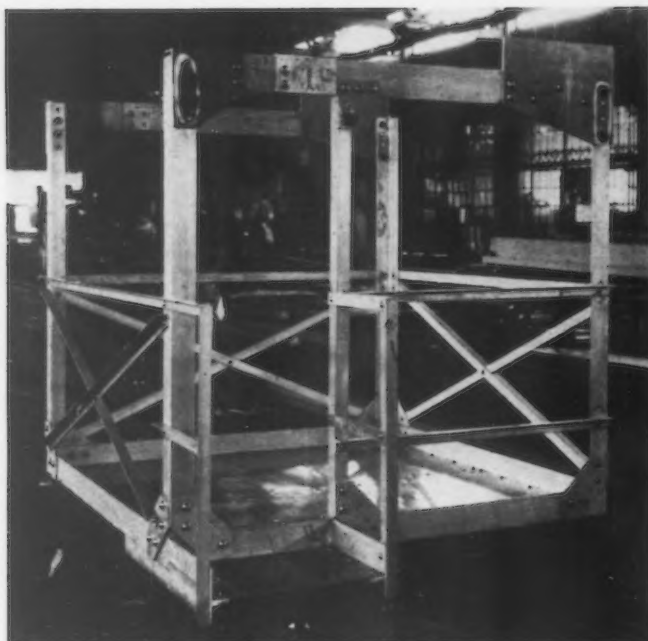
In the same plant a standard steel crane of the same capacity and span length was erected for purposes of comparison. The two cranes were similar in design, with the exception of the girders. One illustration shows the cross-sections of the girders of the two cranes near the center of span. The moment of inertia of the aluminum section about the horizontal axis, based on gross area, is approximately 21 per cent greater than that of the steel section.

Weights of the two cranes are tabu-



Two Girders for the Aluminum Alloy Crane, Showing (in Top Girder) Location of Angles on the Outside. The space between girders illustrates the camber used

\*Physical Testing Division, Aluminum Research Laboratories, Aluminum Co. of America.



Close-up of Girder Before Top Cover Plate Was Applied (Above)

\* \* \*

Assembling Operator's Cage from the Strong Aluminum Alloys (At Left)

lated. A total of 12 tons was saved in the aluminum alloy crane, mostly in the girders. It seems probable that, if a more extensive use had been made of aluminum, notably in the castings for the trolley and end carriages, this saving could have been increased—perhaps to 20 tons. The advantages of such a saving in weight are important.

Where 12 to 20 tons can be saved in the dead weight of the crane, a corresponding reduction can be made in the supporting members through the whole length of the runway. In a building such as the 700-ft. structural mill at Massena this is no small item. The light weight of the crane also permits a saving in power, owing to the smaller inertia to be overcome in starting and stopping.

Tests have been made on the two cranes to compare their performance and action under load. The aluminum alloy crane was found to deflect 1.8 times as far as the steel crane under the same load at the center of the span. This ratio of deflection was less than would be predicted, probably because of the stiffening effect of the extra splice material on the lighter crane. The maximum deflection measured on the aluminum alloy crane was 1.09 in. This occurred under a load of 34,500 lb., which represents an over-load of 72.5 per cent above the rated capacity.

No measurable permanent set was found in the girders upon removal of this load. Strain gage readings taken

at center of span indicated no stresses which exceeded those computed by ordinary design formulas.

In the matter of performance, the aluminum alloy crane has proved satisfactory in every way. Several experienced operators have expressed the opinion that it is very easy to handle and quick to spot. While the crane has not been in use long enough to obtain a definite comparison of power requirements, indications point to a much lower power consumption than is necessary to operate the heavier steel crane of the same capacity.

### New Building for Mellon Institute

Construction of a second building, to house the investigations excluded from the original Mellon Institute for lack of space, will be undertaken in the near future, according to an announcement by Dr. E. R. Weidlein, the director. The original building, constructed in 1915 on a site near the University of Pittsburgh, was thought to provide adequate space for growth; but for several years past the institute has had a waiting list of companies desirous of availing themselves of the facilities offered.

In addition to providing a greatly increased number of laboratories, the new building will give more commodious quarters for the general depart-

ments. The present library contains 11,000 volumes; the new library is planned to accommodate 250,000. The present department of research in pure chemistry will be expanded and facilities for pure research in other branches of science will be provided. Much more elaborate chemical engineering laboratories are to be available, and also the fellowships in each specific field of industrial research are to be grouped in suites of rooms so that they can best make use of general apparatus adapted to their needs. Certain rooms will be equipped for specialized phases of experimental technique, such as electrochemistry, spectroscopy, low-temperature studies, radiations and high-pressure experimentation.

The new structure will be seven stories high, approximately 300 by 400 ft. in plan. The laboratories are to face on interior courts, and the design is such that additional laboratory suites can be constructed in the interior courts without marring the beauty of the general appearance and without interfering in any way with the original units.

Members of the faculty of Case School of Applied Science, Cleveland, are beneficiaries of a \$100,000 gift made to the Cleveland Foundation by the late J. D. Cox, it is announced by officials of the Cleveland Trust Co., trustee of the estate. Mr. Cox died Feb. 23, 1930. Under the terms of a trust agreement, a fund of \$100,000 is to be administered by the foundation and the income distributed to full professors at the school on a scale graduated upon length of service. According to his son, J. D. Cox, Jr., president of the Cleveland Twist Drill Co., Mr. Cox was a trustee of Case school for many years and his gift reflects his interest in the institution.

#### COMPARATIVE WEIGHTS OF ALUMINUM AND STEEL 10-TON CRANES

	Aluminum Crane	Steel Crane
Trolley, including motors, brakes, etc. (a).....	16,000	16,000
Main girder, including shafting, pedestals, walkway, rail, etc. ....	14,100	24,000
Bridge motor and supports.....	3,900	4,800
Auxiliary girders, including conductor angles, brackets, etc. ....	11,900	20,200
End carriages (a).....	15,000	15,000
Operator's cage, including controls, etc.....	3,200	5,000
Miscellaneous items .....	2,900	6,000
Total .....	67,000	91,000

(a) Not fabricated from aluminum.

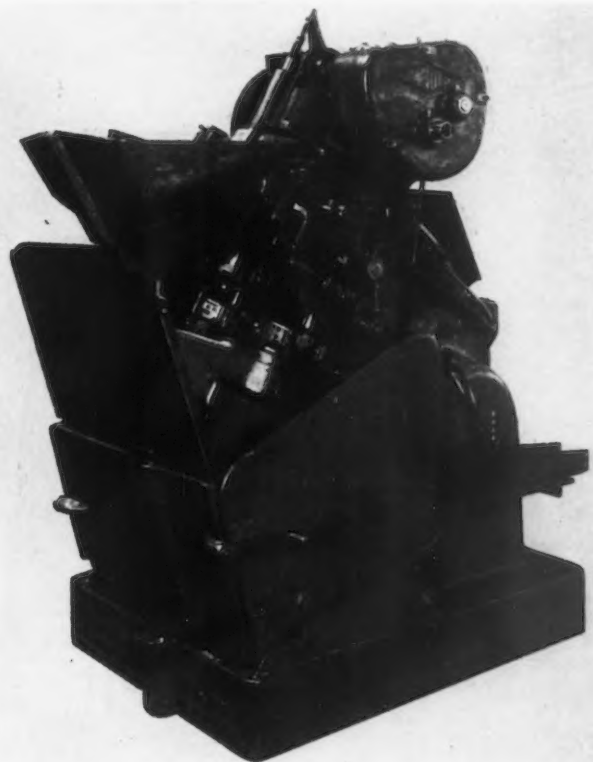
# Threads Bolts and Screws Automatically

## 1-In. Forming and Threading Machine Designed for Faster and More Accurate Production

**F**OR the automatic threading of bolts and screws ranging from  $\frac{1}{2}$  to 1 in. in diameter and up to 6 in. in length, the Landis Machine Co., Waynesboro, Pa., has brought out a 1-in. size of its automatic forming and threading machine.

Although similar to the  $\frac{3}{4}$ -in. unit described in THE IRON AGE of Dec.

Return of the forming and threading head and indexing of the turret chuck are at a constant rate, regardless of the diameter, pitch, length of thread, quality of material or threading speed. The instant that the forming and threading operations are completed, an automatic accelerated motion, entirely independent of the cut-



**B**OLTS and Screws from  $\frac{1}{2}$  to 1 In. in Diameter and Up to 6 In. in Length, with a Length of Thread Up to  $2\frac{1}{2}$  In. Can Be Produced. Features include a special die head, hopper feed, generous use of alloy steel and a new chucking arrangement

27, 1927, this new machine, in addition to being larger, has new features intended to provide faster, more accurate and safer operation. It will thread any length up to  $2\frac{1}{2}$  in. and will produce cupped, flat, round, dog point or full cone points. Full thread at the start, accurate lead and minimum of taper are claimed for the new machine.

A special 1-1/16-in. Lanra threading head of pull-off type and equipped with the company's "long-life" chasers is a feature. Hopper feed is used. After being dumped or shoveled by hand in the hopper, the bolt or screw blanks are delivered through a magazine to fingers which transfer them to grips in the turret chuck. The length of the finished bolts is controlled by an adjustment of the transfer bracket, this member being graduated for various bolt lengths.

Heat-treated alloy steel is used extensively throughout the machine, this material being especially advantageous in the new chucking arrangement, making possible a stronger and lighter turret chuck, with considerable increase in speed of indexing.

ting speeds, withdraws the forming and threading spindles and indexes the turret. The new chucking arrangement decreases the chucking and indexing time, and increasing production considerably.

Similar to the turret chuck on the  $\frac{3}{4}$  in. unit, the new chuck has three stations, one for unloading and loading, one for cutting to length and forming the end of the screws, and one for threading. These operations are performed simultaneously. An ejector at the unloading and loading station serves to remove the bolt in case it fails to drop from the grip.

By means of a special adapter, the grips common to the  $\frac{3}{4}$  in. unit may be used on the 1 in. machine, and an improved line of sockets and grips that handles practically every type of bolt and screw has been developed. Short bolts may be threaded up close up to the head. Square-head bolts that vary in head size and that require a thread close to the head are handled by a unique bolt guide attachment; this device gives the bolt a 90 deg. turn permitting the bolt to be gripped across the corners. This method

maintains a concentric thread form when there is a large variation in sizes on this type of bolt heads. Oval neck bolts, guy clamp bolts, chuck bolts, fillister head carriage bolts, etc., are all handled in a satisfactory manner by this new set of sockets and grips. Included in this set are grips for all types of aviation bolts and screws.

The arrangement for opening and closing the chuck on a pivot that is parallel to the bolt, insuring thread concentricity regardless of variation in size, has proved very satisfactory on the  $\frac{3}{4}$ -in. machine, and has been retained on the new 1-in. unit.

The 1-1/16 in. Lanra threading head, developed expressly for this machine, is made of a high carbon steel, heat-treated throughout and ground. It is centrally located in the front of the machine and it is screwed to the nose of the spindle. It may be removed quickly without dismantling the yoke. Among safety devices is one for closing the threading head in case a screw is accidentally twisted off in the head.

A forming head that is threaded for easy attachment and removal to the spindle nose is also of new design. This head, made of steel, is attached to a special alloy-steel bushing that is said to have unusual wearing qualities. Pick-off gears permit quick changes in the speed of the forming and threading heads. Speeds from 20 to 50 ft. per min. can be obtained for any diameter. An oscillating conveyor that can be arranged for delivering the bolt at either the front or rear of the machine is standard equipment, but other methods to suit individual handling methods and plant conditions can be furnished. The machine is furnished either for belt or motor drive. It will be demonstrated at the Municipal Auditorium, Atlantic City, N. J., during the convention of the American Railway Association, to be held June 18-25.

## Standardization of Gages Recommended

Thirty-five representatives of manufacturers and users of pressure and vacuum gages and of technical, governmental and safety bodies having an interest in such gages were present at a recent conference in New York, and took steps looking toward the establishment of national standards for such equipment.

The conference favored specifications which would unify the external features of gages of the indicating types, and permit a reasonable amount of interchangeability between the various makes.

Representatives of the steam power, petroleum, traction, gas and chemical industries were particularly eager to have the standardization undertaken. One manufacturer pointed out that at present it was necessary for him to carry in stock 72 gages of the same size in order to meet the demands of his customers.

## Four-Spindle Gridley Heavy-Duty Automatic

**F**OUR independently-operated cross-slides are standard equipment on the new model G. A. Gridley four-spindle automatic illustrated, which has been added to the line of the National Acme Co., Cleveland.

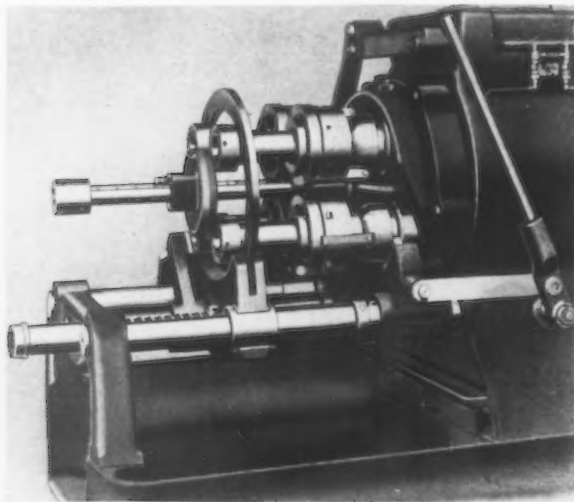
Each cross-slide is supported on the outer edges and rides on hardened strips. The two lower slides are operated by a separate drum directly

and chucking slides have been eliminated.

The column of the machine, in front of the gear box section, is bored in line with the spindles in second and third positions. This permits the use of high speed drilling attachments or accelerated boring or reaming attachments in these positions.

A large pan, open on all four sides

keeps the oil cool enough to permit continuous high-speed operation. The top plate of the machine is cast in one piece. The portion over the spindle carrier is cored, and has an oil well from which the spindles are lubricated. The next section is the base or support for the top slides. The section directly over the turret is cored, and carries lubricating oil to the cutting tools. The section over the gear box end of the machine has an oil well for supplying oil to the



underneath and in the center of each slide. The top slides are operated by an extra set of cams on the outer ends of these drums. With this arrangement lever connections are eliminated and with them, it is stated, is eliminated vibration, "give" and inaccuracy.

The two bottom slides do the rough forming, finish forming and cutting off being done in the two top positions.

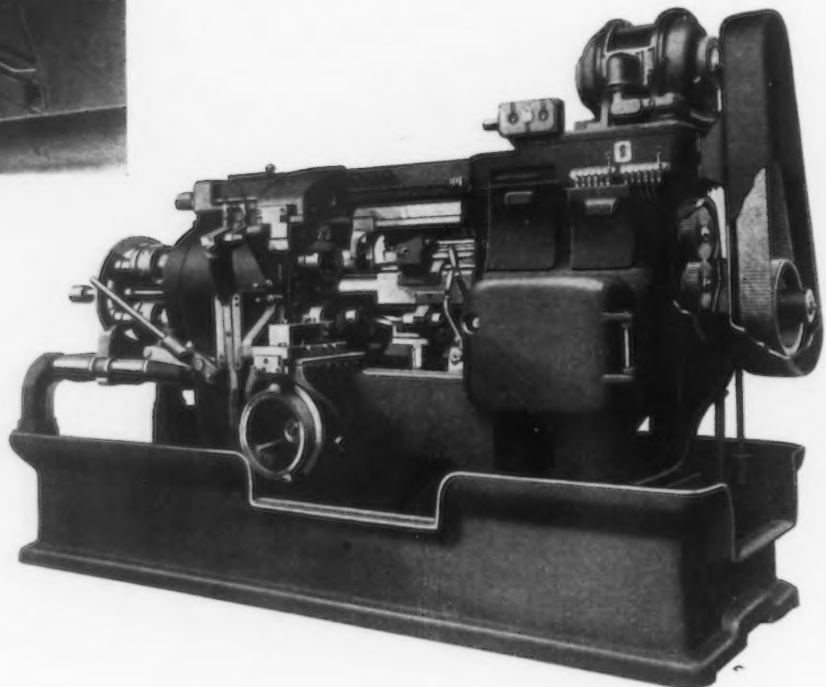
End working tools are carried in a heavier main tool-slide which works back and forth on the stem of the spindle carrier. This main tool-slide supports the cutting tool holders which are mounted on the four corners of the tool-slide by means of bolts and T-slots. The spindle carrier and main tool-slide are of the Gridley-integral construction, being supported by three main bearings, two in the spindle carrier itself, the other at the extreme opposite end in the frame of machine. The main tool-slide operated on this stem insures proper and permanent alinement of the cutting tools with the work spindles.

Spindle speeds range from 35 to 500 r.p.m. The feed box, with a  $\frac{1}{2}$ -in. cam, has a feed range from 0.001 to 0.140.

An improved vertical disappearing stock stop is employed. The plunger rises and falls, being operated by a cam on the inside of the turret slide cam, which is completely housed. This arrangement permits standard tooling on the fourth spindle the same as on any of the other three positions. The chuck closing slide is supported on the outer end so that no cramping action can take place. All keys in the feed

**T**HE Cross-Slides Have Been Enlarged and Strengthened. Rough forming is done by the two bottom slides, and finish forming and cutting off is done in the two top positions

An improved vertical disappearing stock stop is employed. The support for the stock feed mechanism is shown in the close-up view



for the easy removal of chips and work, is provided. It is unnecessary to stop the machine while removing chips. This new pan has three times the capacity of the former style, and

gear box section; it also serves as a motor base.

Four sizes, 1 $\frac{3}{8}$ , 1 $\frac{1}{2}$ , 2 $\frac{1}{2}$ , and 3  $\frac{5}{16}$  in., of the model G. A. Gridley automatic are built.

### Stokers, Electric Trucks and Steel Barrels

	April, 1930	March, 1930	April, 1929
Mechanical stokers sold (a).....	102	85	141
do., four months.....	313	.....	435
do., rated horsepower.....	34,730 (b)	27,951	48,749
do., four months.....	98,587	.....	165,127
Electric industrial trucks and tractors shipped (a).....	106	123	194
do., four months.....	482	.....	691
Steel barrels produced (a).....	769,661	842,186	771,584
do., four months.....	2,910,720 (c)	.....	2,639,639
do., unfilled orders.....	1,691,461	1,897,913	1,269,044

(a) United States Department of Commerce.

(b) Largest since last December.

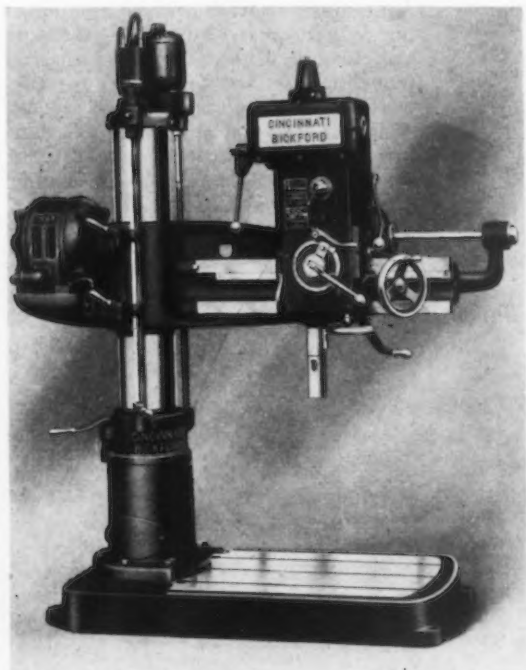
(c) Largest total ever reached in first four months.

## Centralized Control Features 3-Ft. Radial Drill

**C**ONSTANT-SPEED drive and control of all speed changes at the head, features of the Super Service radial drills built by the Cincinnati Bickford Tool Co., Cincinnati, are incorporated in the company's new 3-ft. radial here shown.

This machine, designated as the No. 2-A, is built with a 3-ft. arm on a 9-in.

constant speed motor directly to the armshaft. Driving clutches operate at constant speed, and are not subjected to additional strain by being run slower when under heavy loads imposed by large diameter drilling and boring. This is said to be because all spindle speed changes are made in the head and the armshaft



**ALTHOUGH** of a lighter type than the "Super Service" Line of Radials, This Machine Has the Same Advantages of Constant-Speed Drive and Control of All Speed Changes at the Head. It is built with a 3-ft. arm on a 9-in. column; speeds range from 71 to 1500 r.p.m.

column and has a speed range of 71 to 1500 r.p.m. The 12-speed head is of ball and roller bearing construction, is entirely inclosed and is oiled automatically. Reduction gearing is eliminated and a more compact drive arrangement obtained by coupling the

speed is constant. Proper speed range is provided for diameters from 3/16 to 4 in.

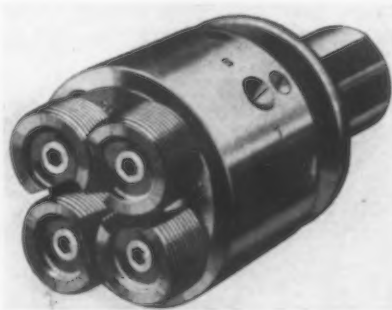
Either the constant-speed motor drive arrangement illustrated or constant-speed pulley belt drive can be furnished.

## Die Heads with Removable Circular Chasers

**O**PENING die heads of revolving type with quick removable circular chasers are being marketed by the National Acme Co., Cleveland. These die heads, designated as the style D R Namco, are for use in automatic screw machines and other machine tools having "live" or rotating die spindles. They are designed for long runs of parts, where minimum of "down time," as well as close accuracy, is required.

These dies have only three major parts, body, cup and adjusting plate. All members are of steel, hardened, and every vital surface is precision ground. The circular chasers are claimed to permit unusually long runs between grinds. They are accurate circular thread forming tools mounted upon "quick removable" chaser blocks, the faces of which are ground to the exact helix angle of the thread. The chasers are located by serrated steel buttons, and each chaser

being held down to its block by a hollow head screw. Chips shoot out ahead of the chasers. Close-to-shoulder threading is said to be safe practice because of the positive action of the die in opening. Tripping and resetting is by an outside fork or an



Unusual Length of Chaser Life Is Claimed for This Revolving Type Die Head

inside trip, or by a combination of these.

The style D R dies are made in six sizes ranging in capacity from 3/16 in. to 2 3/4 in.

## New Tool Cabinet with Adjustable Partitions

**S**TORING and safeguarding drills, reamers and other small, expensive tools is usually a source of trouble, especially when tools are stored outside of a toolroom. For this purpose a steel storage cabinet has recently been developed by the All-Steel-Equip Co., Aurora, Ill.

Each of four types of cabinet offered has steel angle and channel frames, with substantial body members to sustain heavy weight. Standard equipment includes six adjustable sloping shelves with five adjustable partitions in each and one horizontal shelf near the bottom.

All tools are in plain sight and compartments may be labeled. The cabinets are finished in green baked enamel, and when tools are stored out-



side the toolroom, a model with a Yale lock in the doors is available. The doors are panel reinforced with three-point latching device and vault-type handles.

## Crane Co. to Celebrate 75th Anniversary

The Crane Co. will observe its seventy-fifth anniversary with festivities from June 29 to July 3. Picnics are to be held throughout the world by Crane employees on July 3 as a climax to the five-day celebration. The Crane Co. was organized in 1855 by R. T. Crane, who started in business with three employees in a frame building at Fulton and Canal Streets, Chicago. At present 20,000 persons are employed.

## Buffing Lathe for Large Pieces

**L**ARGE and awkward pieces may be buffed and polished conveniently on the buffing lathe illustrated, the base of which is designed with a straight front to give maximum working space and permit freedom of foot movement for the operator.

The machine is built by the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. The spindle is driven by a squirrel cage ball-bearing motor through multiple V-belts, the motor being mounted inside the base on a saddle which may be swung up or

of the bearings and tight collars on the spindle before the latter is mounted in the machine. Thus, it is pointed out, fits may be used which will never peen loose; the four ball bearings are closely aligned, producing a well-supported and smooth running spindle. The bearing housings have large oil reservoirs into which the balls dip, and are dust proof.

Spindles are of high-carbon steel and are ground. The tight collars are force fits. A locking pin built into the machine permits locking the wheel



**T**HE Straight Front Facilitates Handling Awkward Pieces. The spindle and motor is equipped with ball bearings

down to make necessary center adjustments on the drive. This saddle is adjusted by means of a square headed coil-spring cushioned screw that projects from the back. Changes in spindle speed are made by changing the sheave on the motor, such changes being made conveniently.

The wheel spindle is carried on four sets of ball bearings, two sets in each cast-iron housing. Being of split type these housings permit unit assembly

spindle when changing wheels. Motors ranging from 3 to 10 hp. (1800 r.p.m.) are employed. They are said to withstand temperatures above 90 deg. C., as well as abrasive dust, moisture, acid and other damaging material. The machines range from 1020 to 1300 lb. in weight and from 52 to 63 in. in distance between wheels. Regular equipment includes automatic starter, voltage protection, pushbutton control, and two sizes of motor sheave.

## New Car Wheel Gages

**T**WO new car wheel gages, a maximum flange thickness gage for cast-iron wheels and a standard mounting and check gage for cast-iron and cast steel wheels, have been announced by the Brown & Sharpe Mfg. Co., Providence, R. I.

The gage for the rapid and accurate checking of the flange thickness of new cast-iron wheels, designated as the No. 728 B, is made of tool steel

and is accurately machined and hardened.

The standard mounting and check gage, designated as the No. 728 C, has gaging surfaces of tool steel. These surfaces are held in correct positions by a T-section tie bar, making the tool rigid although light in weight. A wheel defect, worn coupler limit and worn journal collar gage, designated as the No. 728 A,

**C**AR Wheel Flange Thickness Gage Made of Tool Steel and Checked to Conform to A.R.A. Standard



is also manufactured by the company.

All of these gages are checked against accurate master gages for exact conformity to the standards of the American Railway Association.

## Crane to Expedite Building and Demolition

**C**OST cutting and time saving are claimed in steel erecting and building demolition, by the Universal Crane Co., Lorain, Ohio, for a new special traveling carriage to be used for this work on buildings of any size and description. The traveling carriage, pictured here, consists of a structural steel carriage, capable of developing the full capacities of the crane, mounted on wheels which can run on



rails laid on top of the structural beams of the building.

Since the distance, center to center of columns, varies, the traveling carriage is telescopic; the wheels can be made to fit rail gages varying from 15 to 20 ft. Thus, by laying rails on the building beams and raising the crane and mounting up into the building, the crane can work straight through on one bay, extending the rails ahead of it. It can then set two or three bays on each side, as it works its way through.

To move the unit to another bay, transverse wheels, at right angles to the above wheels, are furnished. By means of large jack-screws in the traveling carriage, the unit is jacked up clear of the rails. Transverse rails are then slipped beneath the transverse wheels. Thus the unit is moved under its own power into the adjoining bay. The longer rails are placed underneath it again, and the unit lowered into place on them to work through the next bay.

# Steel Production Has Been Above Demand

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

**W**HILE the composite steel demand index for April is a little over 102, the steel ingot production index for the month is over 125. Both indexes are higher than in March, but the average daily steel production increased somewhat more than indicated requirements, suggesting an even greater excess of supply. This conclusion is amply confirmed by the price situation.

Gain in activity on the part of the chief steel consuming industries in April, though not large, was quite general, including building and construction (floor space), railroad freight traffic, automobile production, general manufacturing and machine tools. Only farm purchasing power and exports of iron and steel declined.

Examination of the accompanying chart gives the general impression that the curve of indicated steel requirements is moving about sideways at a low level. The index for April was the lowest for that month since 1922. Steel production, however, has been maintained near the peak of the early 1930 rally, which is only a little under the same period in 1928 and about the average for the last two years. This is not a sound condition as to demand and supply.

Again the question is: Must the necessary adjustment come about through increased requirements, or decreased output, or both? The answer must be gained through examining the outlook for consuming industries.

## Specific Industries

As to the *railroads*, the outlook is not favorable. April gross earnings and net operating income were respectively 12 per cent and 33 per cent lower than a year ago. Car loadings in May have evidently shown less than the usual seasonal increase and are the lowest since 1924. Orders for freight cars fell sharply in March and April. Domestic orders for steam locomotives have been barely fair, and unfilled orders for locomotives have shown a declining trend throughout the first four months. Meanwhile, shipments gained, a condition usually unfavorable.

*Automobile* production has been fair. Now, however, the seasonal peak is past and there is little reason to doubt some reduction in steel requirements. Ford appears to have about reached maximum production levels. Detroit parts makers have been taking less material. Orders for malleable castings declined sharply in April. The motor industry is highly competitive and some price cutting continues. But, on the whole, the industry is holding about the same level as at this season in 1926, 1927 and 1928. If there were only the normal proportion of heavy cars, the situation would not be so bad.

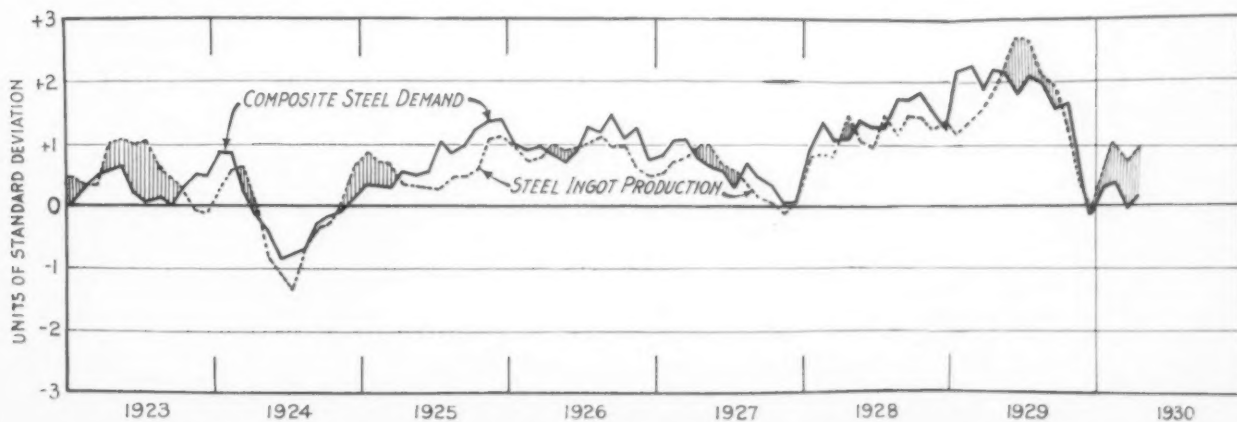
*Building* activity is doubtless close to bottom, but there is little trend. Monthly orders for structural steel have declined, but that results chiefly from a somewhat abnormal spurt earlier in the year. The bond market continues dull and backward. Money is not so "easy" as money rates would indicate. Probably building is in for several months of dullness, with little if any further decline, but not much recovery.

The tendency is to curtail *mining* and oil production. The *farm* situation is not bright, in view of the large carryover of wheat and cotton and generally low prices. The general outlook for *exports* is discouraging.

## Principal Active Outlets

Chiefly in connection with the rapid development of natural gas, the demand for pipe-line material promises to continue large. Road construction programs are being carried out extensively. Shipbuilding is on the increase. Heavy construction projects will develop from time to time. These seem likely to be the chief sustaining factors.

Our net conclusion is that steel production, since February, has been above requirements; that there is no probability of any expansion in total requirements, but rather some recession; and that steel production is likely to decline, accompanied by further moderate price weakness.



Demand Continues Below Output by a Margin Which Does Not Grow Less. Few instances in the past seven years show its equivalent

# This Issue in Brief

Time payment plan is backbone of campaign to pull construction industry out of the slough caused by falling off in home building. Radiator manufacturer's plan to modernize home heating systems is built around instalment selling.—Page 1663.

\* \* \*

Tensile test of cast iron is preferred by engineers, says metallurgist. The transverse test is the simplest and most commonly used, but results are often contrary to facts.—Page 1679.

\* \* \*

Aluminum alloy traveling crane proves worth in test. Span is 72 ft. Weight saved compared with steel is 12 tons. With overload of 72.5 per cent maximum deflection was only 1.09 in. No permanent set in girders was found.—Page 1690.

\* \* \*

Coke has strong influence on carbon of the molten iron. Ash content and burning rate are important factors. For ordinary cokes, the higher the temperature, the lower the carbon equilibrium point.—Page 1680.

\* \* \*

"Further moderate price weakness" for steel is prophesied by Dr. Haney. Steel output since February, he declares, has exceeded demand.—Page 1695.

\* \* \*

Core-making costs cut by continuous conveyor oven having a trolley which travels both horizontally and vertically. Horizontal travel gives adequate loading space. Vertical flight provides heat seal and conserves space during baking.—Page 1677.

What causes small blisters on sheets? No one knows. Temperature difficulties or differences, says one open-hearth man. Too thin a slag, says another.—Page 1669.

\* \* \*

Great savings can be made by utilizing waste heat. Almost one-third the fuel entering open-hearth furnaces can be returned in the shape of steam, by specially designed waste-heat boiler.—Page 1683.

\* \* \*

Avoids segregation by melting well above the desired carbon point, and then working it down by stirring with rods. The slag, all through the refining period, is very similar to a finishing slag.—Page 1669.

\* \* \*

To reduce the content of sulphur in cupola metal, add manganese. Manganese has a strong influence on the sulphur, especially around a critical point.—Page 1680.

\* \* \*

"Most highly mechanized manufacturing operation in the world," might well be said of A. O. Smith Corporation automobile frame plant. Entire plant is synchronized and coordinated into one huge machine, operating seemingly without human attention.—Page 1665.

\* \* \*

If you need more power, you can get it more cheaply than installing more boiler capacity, engineer tells steel makers. Simply increase the capacity of hot blast stoves, so that they can meet peaks in power fuel demand.—Page 1683.

Apprentice-training shows a profit. Falk Corporation makes a thorough study of shop production costs and finds that training pays.—Page 1685.

\* \* \*

Almost one-half the earnings of big companies is being put back into the business. Investigation of 104 leading firms reveals that only five dollars out of nine are paid in dividends.—Page 1688.

\* \* \*

Burn garbage instead of coal and eliminate fuel cost. One ton of refuse has the same heating value as 6 tons of coal. Your power plant can be made to show a profit if your municipality pays you for garbage disposal, and you get your power free.—Page 1686.

\* \* \*

Excellent results obtained from open-hearth combustion control equipment. First run of one controlled furnace is 536 heats, and furnace still in good condition.—Page 1670.

\* \* \*

Small probability of early expansion in steel demand, says Dr. Haney. Some recession is more likely. Money is not so "easy" as money rates would indicate.—Page 1695.

\* \* \*

Pneumatic rivet-feeding heads shoot rivets into position in automobile frame parts. Assembly is conveyed automatically to riveting machines.—Page 1668.

\* \* \*

Gets carbon analysis in 3 min. Carbometer enables steel maker to come within one or two points of the actual carbon content, determined by laboratory analysis. Low-carbon steels require 5 min.—Page 1669.

## Two Pioneer Iron Ore Firms Affiliate

Cleveland-Cliffs Iron Co. and Oglebay, Norton & Co.  
Consolidate—Helpful to Eaton Steel Interests

**A**FFILIATION of interests of the Cleveland-Cliffs Iron Co. and Oglebay, Norton & Co., both of Cleveland, two of the oldest and best known iron ore firms, has been consummated, becoming effective June 1. By this alliance the latter company has become linked with consuming interests, and the position of the Eaton group of steel interests has been strengthened by an increase in available reserves of Lake Superior ore.

Oglebay, Norton & Co. is the only one of the four large iron ore mining, shipping and sales companies that has not had the benefit of direct affiliation with a consuming interest. Instead it has disposed of its ore through open market sales, some of these being in the form of long term contracts. With steel plant and blast furnace mergers and the discontinuance of independent merchant blast furnaces, the open market buying of ore has dwindled considerably during the past few years.

During the same time there has been a tendency toward tying up iron ore mining interests with consuming interests, the most important recent move in that direction having been the merger of the ore mining properties of the M. A. Hanna Co. with the Weirton Steel Co. and Great Lakes Steel Corporation into the National Steel Corporation, assuring the Hanna company a permanent outlet for a large tonnage of ore.

### Large Outlet for Iron

The Cleveland-Cliffs company, through its affiliation with the Republic Steel Corporation and the Otis Steel Co., has a large outlet for its product, and its more recent affiliation is with the Corrigan-McKinney Steel Co. There has been a certain community of interest between the Cleveland-Cliffs company and Oglebay, Norton & Co., as some of the larger stockholders of the former have been heavily interested in some of the mining properties and boats of the latter.

"This affiliation," according to a joint announcement issued by the two companies, "brings about a situation whereby each of the two companies is helpful to each other, for, whereas the principal business of the Cleveland-Cliffs Iron Co. is the production, transportation and sale of ore from its own mines, Oglebay, Norton & Co. have successfully developed the business of managing and operating large mines belonging to independent owners, as well as acting as their sales agents. Furthermore, the latter firm has developed agencies covering the sale of ferromanganese, fluorspar and other materials used in the iron and steel business, and the Cleveland-Cliffs Iron Co., by virtue of its large investments in steel companies, will aid in building up these additional departments of their business."

The activities of the two companies span the entire history of the development of iron ore mining in the Lake Superior district and shipping. The Cleveland-Cliffs company has a fleet of 21 Lake boats, with a carrying capacity of 182,000 tons a trip, and Oglebay, Norton & Co. have 10 boats, with a capacity of 98,700 tons a trip. The former company shipped 4,700,000 tons of ore last year and the latter 2,800,000.

The alliance doubtless eventually will prove of advantage to the affiliated steel interests, as both the ore companies have large ore reserves. While the ore reserves of the Republic Steel Corporation are extensive, the joining of interests of the two ore companies adds to the tonnage of ore that this corporation as well as other steel plants affiliated with the two ore firms will be able to draw upon in the future.

The affiliation will not result in any change in the officers of the two companies and their businesses will continue to be operated independently. The terms that resulted in the alliance have not been made public.

The Cleveland-Cliffs Iron Co. is an outgrowth of the Cleveland Iron Mining Co., which started development of iron mining on the Marquette range in 1850, when a few men, including Samuel L. Mather, father of the present president, organized for the purpose of acquiring lands in the Lake Superior district. In 1853 six barrels of iron ore were shipped. In 1855 ore dug with picks and shovels was hauled by mules over a road of strap rails to Marquette and shipped through the newly opened canal around the Sault Ste. Marie to Lake Erie, that cargo having been 132 tons. In 1888 the company built two boats, which were the foundation for its present fleet. In 1895, in conjunction with the Pittsburgh & Lake Angeline Iron Co., it built the Lake Superior & Ishpeming Railway, which now transports its Marquette range ore to Marquette. It acquired the Iron Cliffs Co. in 1890 and with it the Pioneer charcoal blast furnaces. Since that time the company has been a leader in the development of chemical products of wood carbonization. In 1910 it began developing hydroelectric power for the operation of its mines and to furnish light to surrounding communities. It now operates mines on the Marquette, Mesaba, and Menominee ranges. William G. Mather is president of the company, S. L. Mather is vice-president, C. G. Heer, treasurer, and V. P. Geffine, secretary.

### Oglebay, Norton & Co. Started in 1861

Oglebay, Norton & Co. is the successor of business started by one of the pioneers of the Cleveland-Cliffs company. Henry B. Tuttle was secre-

tary of the Cleveland Iron Mining Co. and, after severing his connection with that company, started in the iron ore business for himself in 1861 under the name of Tuttle & Co. The firm was reorganized in 1884 under the name of Tuttle, Oglebay & Co., the junior partner being the late Earl W. Oglebay, at the time a director of the Benwood Iron Works and Bellaire Nail Works, Wheeling, W. Va., who had become interested in the use of old range ores in the Wheeling furnaces. The firm was reorganized in 1890 under its present name, David Z. Norton becoming a partner. In 1892 Oglebay, Norton & Co. shipped the first iron ore produced from the Mesaba range. The firm became an incorporated company in 1924. Crispin Oglebay is president, R. C. Allen, first vice-president, H. K. Bourne, second vice-president, R. C. Norton, treasurer and A. C. Bishop, secretary.

## Mill Supply Trade Plans Publicity Campaign

Manufacturers and distributors of mill supplies, in accordance with the report of a joint merchandising committee authorized at their convention at Memphis, Tenn., April 4, have proposed a national advertising campaign and a program of research.

Subscriptions to carry on this campaign are being solicited, the amounts to range from \$50 a year for those doing an annual volume of less than \$250,000 to \$625 a year for those doing upward of \$2,000,000 annually.

The research program will be executed by investigators of the School of Commerce, Northwestern University, under the direction of members of the faculty who have achieved reputations as authorities on marketing and distribution. About 20 problems of manufacturers will be studied to determine what benefits manufacturers, distributors and users of mill supplies can secure which are not now being enjoyed. Several score distributors will also be studied closely to see what is now being done and to determine what service to manufacturers and users might profitably be added. Buying habits of about 100 users will be gone into to determine how the user should buy mill supplies to best advantage.

Investigations have been conducted to determine what publications shall be used in the advertising campaign. Two complete cities, the committee report says, have had their reading habits analyzed in detail, on the basis of personal calls on every family. From this investigation the committee has selected a limited list of national magazines and a rather broad list of prominent business papers.

Such publication advertising as is done will be supplemented by direct mail work and the efforts of a speakers' bureau "to the end the true story of sound mill supply distribution will be told millions of times each year to everyone involved in making, buying and selling mill supplies."

## Program for Iron and Steel Engineers' Meeting

Furnace control, wire making, welding, lighting, shop practices, rolling mill theory and anti-friction bearings are on the technical program for the June 16 to 20 meeting of the Association of Iron and Steel Electrical Engineers, to be held at the Hotel Statler, Buffalo. This is the twenty-sixth annual convention. Included among the papers are the following:

### June 16

"Shop Practices in the Iron and Steel Industry," by J. J. Booth, electrical superintendent, National Tube Co., Gary, Ind.

"Steel Mill Lighting Problems," by R. F. Sanner, assistant to the electrical engineer, Carnegie Steel Co., Duquesne, Pa.

"Industrialization in the U.S.S.R.," by Gordon Fox, electrical engineer, Freyn Engineering Co., Chicago. Mr. Fox has just returned from the U.S.S.R.

"Should Universities and Colleges Establish a Safety Engineering Course in the Curriculum?" by J. A. Voss, Central Alloy division of Republic Steel Corporation, Massillon, Ohio.

### June 17

"Theory of Rolling of Plastic Materials," by Ferdinand G. Gasche, combustion engineer, Bethlehem Steel Co., Lackawanna, N. Y.

Discussion: "A Rolling Mill Analysis," by E. Kieft, engineer of tests, Illinois Steel Co., Gary, Ind.

"Applying the Principles of Steel Mill Practice to Arc Welding," by J. B. Austin, research engineer, Una Welding & Bonding Co., Cleveland.

"Installation of Electric Skip Hoist, Bell Hoist and Stock Line Recorder at the Anzan Steel Works, South Manchuria, China," by Frank Smith, Otis Elevator Co., Pittsburgh.

Moving picture—"From Raw Materials to Finished Product," by George Richardson, Bethlehem Steel Co., Bethlehem, Pa.

"Recent Developments in Industrial Furnace Design," by George R. McDermott, vice-president and general manager, Chapman-Stein Co., Mount Vernon, Ohio.

Symposium, "Open-Hearth Furnace Control," by R. W. Simpson, American Heat Economy Bureau, Pittsburgh, and Joseph F. Shadgen, Smoot Engineering Co., New York, and representatives from Shallcross Controls Systems Co., Bailey Meter Co., Leeds & Northrup Co., Republic Flow Meters Co., Morgan Construction Co., Brown Instrument Co. and Bristol Co.

### June 18

"Anti-Friction Bearings for Mill-Type Motors, General Purpose Motors, Electric Overhead Traveling Cranes," by Committee on Bearings; F. D. Egan, chairman,

electrical superintendent, Bethlehem Steel Co., Lackawanna, N. Y.

"Anti-Friction Bearings for Roll Necks," discussed by steel mill executives, engineers and anti-friction bearing manufacturers.

"Methods of Drawing Rods," comments on a European rod-drawing process, as observed on a trip just completed through European wire mills, by Kenneth Lewis, vice-president, Morgan Construction Co., Worcester, Mass.

"Latest Developments in Wire Drawing, Wire-Forming Machinery and Equipment," by C. S. Arms, consulting engineer, Sleeper & Hartley, Inc., Worcester, Mass.

"Galvanizing," by W. H. Spowers, Jr., consulting galvanizing engineer, New York.

Moving picture—"Making Steel Wire," by American Steel & Wire Co., Cleveland.

Moving picture—"Story of Monel Metal," by International Nickel Co., New York.

Two inspection trips are planned, one to the Lackawanna plant of the Bethlehem Steel Corporation and the other, for combustion engineers only, to the Steel Co. of Canada, at Hamilton, Ontario. After the Hamilton visit a discussion will be held on the "Use of Mixed Gases in Steel Plants."

An elaborate industrial exhibition will be held in the Broadway Auditorium, with more than 50,000 sq. ft. devoted to the numerous booths. Many items of steel mill equipment will be shown in operation.

## Boston "Tech" Expands Course in Administration

A course in engineering administration, started in 1914 at Massachusetts Institute of Technology, has proved so successful that it will be expanded into a separate department of instruction known as Business and Engineering Administration. The present enrollment of about 300 students and the history of the alumni indicate that both undergraduates and industry generally believe that there are many opportunities for young men in the administration of plants and operations which depend primarily upon machines, power and mechanical skill. This new department will not only have a comprehensive curriculum leading to the usual bachelor's degree, but will offer graduate work to other engineering graduates necessary for a master's degree in business and engineering administration.

## National Steel Organizes Western Subsidiary

The Midwest Steel Corporation has been incorporated as a wholly owned subsidiary of the National Steel Corporation, Pittsburgh, to build a complete steel-making plant in the Chicago district. An Indiana corporation, the new company has taken over from the Weirton Steel Co. a 1000-acre tract on Lake Michigan, about six miles east of Gary, Ind., on which the new plant will be located. Plans for the development are already in process of formulation and actual construction will likely be commenced late in 1931 or early in the following year. The initial installation will probably consist of a coke plant and blast furnace, a group of eight open-hearth furnaces and finishing mill capacity, the exact nature of which has not been decided. It is the plan of the National company, however, to install in the Chicago district mills that will complement the steel finish-capacity of its other subsidiaries, the Weirton company and the recently organized Great Lakes Steel Corporation, thus giving the parent company a completely diversified line of products.

The present capitalization of the new corporation is nominal, but will subsequently be enlarged to probably \$50,000,000. Officers are E. T. Weir, chairman of the board; J. C. Williams, president; C. H. Hunt, vice-president in charge of design and construction, and F. M. Hesse, secretary and treasurer. Mr. Weir holds corresponding positions in both the National and Weirton companies; Mr. Williams is president of Weirton; Mr. Hunt is assistant to the president, and Mr. Hesse is secretary and treasurer of the National corporation.

The present expansion program of the National corporation subsidiaries is proceeding rapidly. The open-hearth plant of the Great Lakes company at Ecorse, Mich., will be ready to make steel in August, while the bar and strip mills will begin production by Sept. 1. The combination mill at Weirton will be completed Jan. 1 and will give the company capacity for rails, structurals, bar mill products, splice bars and tie plates.

## Use of "Stainless Steel" in Publicity Restricted

WASHINGTON, June 3.—"Stainless steel" as a trade name in advertisements will no longer be displayed by companies selling and distributing certain types of cutlery and kitchen tools when the name applies to a product not made wholly of stainless steel, according to a stipulation signed with the Federal Trade Commission.

Warren Foundry & Pipe Co. has moved its Boston office from 201 Devonshire Street, to 75 Federal Street.

### Fabricated Steel Plate Orders Lower

	April, 1930	March, 1930	April, 1929
Total orders, net tons (a).....	36,640 (b)	38,051	42,063
do. per cent of capacity.....	46.6	48.4	52.7
do. four months.....	153,099	153,099	191,180
Oil storage tanks.....	7,509	6,593	5,984
Refinery materials and equipment....	3,869	4,301	3,523
Tank cars.....	2,648	4,914	442
Gas holders.....	5,350	1,819	2,483
Blas furnaces.....	343	2,749	2,462
Stacks and miscellaneous.....	16,921	17,675	23,169

(a) United States Department of Commerce.

(b) Smallest, with three exceptions, since January, 1929.

## Recession Approximates 1924

Greater Declines Than in 1927 in Most Items of Comparison,  
But Far Less Than in 1921

A FINANCIAL writer has made for the New York *Herald Tribune* a comparison between the business recession through which we are passing and the three others we have suffered since the boom in 1920. He has analyzed the Federal Reserve Board's monthly index of production in basic industries, the factory employment figures of the Department of Labor, the Federal Reserve monthly index of wholesale trade, its index of building contracts, the monthly totals of car loadings and the wholesale price index of the Bureau of Labor Statistics.

Each of these is reviewed to ascertain the extent of its fall, from the peak just preceding the break to the bottom of the succeeding "valley." The periods of survey were: January, 1920, to July, 1921; January to June, 1924; September, 1926, to November, 1927; June to December, 1929.

Changes in the basis on which some of the data are now compiled made necessary some adjustment from the bare figures. The respective declines, adjusted where needed, are shown in the table.

Declines in Four Recessions  
(In Per Cent of Previous Peaks)

	1920	1926-27	1924	1920-21
Production in basic industries .....	22	12	22	36
Factory employment ..	10	5(a)	15(b)	33
Wholesale trade .....	..(c)	8	25(d)	51
Building contracts ..	12	15	26	58
Car loadings .....	14½	13	18	19
Wholesale prices .....	7½	6	9½	47

(a) Extended to 8 per cent, in January, 1928.  
(b) From June, 1923.  
(c) No present basis for comparison; prices have a large bearing.  
(d) October to December, 1923.

### Newark Foundrymen Elect New Officers

The annual meeting of the Newark Foundrymen's Association was held on Wednesday, May 28, at the Down Town Club in Newark, N. J. William H. Mantz, general manager of the Atlas Foundry Co., Irvington, was elected president for the ensuing year. Other officers elected were: Vice-president, H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J.; treasurer, J. A. Williamson, Isbell-Porter Co., Newark, N. J.; secretary, G. W. Hannay, Barnett Foundry & Machine Co., Irvington, N. J.

The executive committee elected consists of: J. L. Carter, Sacks-Barlow Foundries, Inc., Newark, N. J.; F. D. Campbell, Eastern Corporation, New York; C. E. Dieseroth, Elizabeth Foundry, Elizabeth, N. J.; R. B. Flynn, F. L. Smidth & Co., Elizabeth, N. J.; P. R. Van Dyne, Meeker Foundry Co., Newark, N. J.; Angus MacDonald, Snead & Co., Jersey City, N. J.; W. F. Perkins, Worthington Pump & Machinery Corporation, Harrison, N. J.; D. L. Sacks, Sacks-

Barlow Foundries, Inc., Newark, N. J.; V. Vandervoert, Watson Machine Co., Paterson, N. J.

J. L. Carter, Sacks-Barlow Foundries, was the retiring president.

The meeting was addressed by J. G. Pearce, director of the British Cast Iron Research Association, who spoke on cupola control, sand control and labor-saving equipment.

### A. M. Byers Co. to Start New Pipe Plant July 1

The A. M. Byers Co., Pittsburgh, plans to begin operation of its new plant at Ambridge, Pa., for the manufacture of wrought iron, about July 1. Practically all of the equipment has been installed and some of the units, including the Bessemer converters, are already being warmed up preparatory to production. The plant will utilize the Aston process of making wrought iron mechanically and entirely eliminating the old hand puddling methods.

The company has purchased an additional tract of land adjoining the Ambridge plant, which will be used for future expansion.

### English as Mastered in Manchuria

The struggle of the Oriental mind with epistolary English, especially business English, has been exemplified time and again in the reprinting of letters received by American firms from Asiatic correspondents. One of the latest is this which THE IRON AGE has received from an American resident of Mukden, Manchuria. Presumably it came in the mail from an English house located at Mukden:

Sirs: I am Wang. It is for my personal benefit that I write for a position in your honorable firm. I have a flexible brain that will adapt itself to your business and in consequence bring good efforts to your

honorable selves. My education was impressed upon me in the Peking University in which place I graduated Number One. I can drive a typewriter and my English is great.

My references are of the good, and should you hope to see me, they will be read by you with great pleasure. My last job has left itself from me for the good reason that the large man has dead. It was on account of no fault of mine.

So, honorable sirs, what about it? If I can be of use to you, I will arrive on some date that you should guess.

### Hartford Steel Treaters Celebrate

Celebrating 10 years of steel treating progress, the Hartford chapter of the American Society for Steel Treating held its tenth annual meeting and banquet Saturday evening, May 24, at the City Club, Hartford. Special entertainment and music were provided as well as addresses by prominent speakers.

### Republic Steel Common Put on \$4 Basis

Directors of Republic Steel Corporation at a meeting May 28 declared initial dividends on both preferred and common stock. The latter was put on a \$1 a share quarterly basis, the same rate that had been paid by the Republic Iron & Steel Co. The directors also passed a resolution of appreciation of the late Elmer T. McCleary, who was president of the corporation.

The Stoker Manufacturers' Association at its annual meeting at the Manufacturers Country Club, Philadelphia on May 23, elected the following officers: President, Joseph G. Worker, American Engineering Co.; vice-president, William F. Turner, Flynn & Emrich Co.; secretary, William V. McAllister, Riley Stoker Co.; treasurer, F. H. Daniels, Riley Stoker Co. Two new member companies were admitted: Combustioneer, Inc., Goshen, Ind.; Auburn Stoker Co., Auburn, Ind.

### United States Imports of Pig Iron by Countries of Shipment

	(In Gross Tons)		Four Months Ended April	
	April		1930	
	1930	1929	1930	1929
United Kingdom .....	159	3,000	4,889	17,490
British India .....	10,814	1,826	22,822	17,222
Germany .....	50	.....	50	53
Netherlands .....	693	1,053	2,123	10,958
Canada .....	.....	127	306	386
France .....	.....	.....	.....	.....
Belgium .....	.....	.....	.....	184
Norway .....	354	391	1,280	648
Sweden .....	75	265	834	603
All others .....	38	31	41	128
Total .....	12,183	6,693	42,345	47,672

From United States Department of Commerce.

# PERSONALS

FRANK A. MOESCHL, vice-president in charge of sales of the Newport Rolling Mill Co. and the Globe Iron Roofing & Corrugating Co., Newport, Ky., will have completed 40 years of service with those companies on June 9. Starting as an office boy when the organization was small, he rose steadily as its business expanded until he took charge of the direction of sales effort in this country and abroad.

PAUL B. JOHNSTON has joined the sales department of the Clark Controller Co., Cleveland.

CHARLES W. E. CLARKE, consulting engineer, United Engineers & Constructors, Inc., Philadelphia, sailed on June 4 to attend the World Power Conference in Berlin. He is to present a paper on the power supply for the steel industry. While abroad he will study industrial power problems in large centers.

W. RICHARD WITTE has been appointed manager of the New York district for the sale of atmospheric and fan-type cooling towers manufactured by Machold & Riddell, Philadelphia.

T. W. ROBINSON, vice-president, Illinois Steel Co., is on his way to the United States after spending seven weeks in Europe.

LAWFORD H. FRY has resigned as metallurgical engineer of the Standard Steel Works Co., Burnham, Pa., to become railway engineer of the Edgewater Steel Co., Pittsburgh.

RALPH E. DAY has been elected president of the Bridgeport Brass Co., to fill the vacancy caused by the resignation of CHARLES E. BEARDSLEY. Mr. Day will also retain his title and functions of general manager of the company. Prior to his connection with the Bridgeport company in 1928, he was identified with the American Brass Co. for 22 years. WILLIAM R. WEBSTER, vice-president, has been made chairman of the board and will retain his title of vice-president.

ARTHUR W. TAYLOR, who for the past 10 years has been manager of the Monessen, Pa., works of the Page Steel & Wire Co., has resigned.

O. C. STEINERT, formerly chief engineer of the Pittsburgh Steel Co., has become a member of the engineering staff of the Blaw-Knox Co., Pittsburgh.

J. R. DONALDSON, who has been identified with the Dallas, Tex., office



Frank A. Moeschl

of the Chicago Bridge & Iron Works, has been placed in charge of the Houston, Tex., office of the company.

HARBOUR MITCHELL, formerly assistant to the president of E. J. Lavino & Co., Philadelphia, has been made vice-president.

EUGENE C. BAUER has been elected president of the Kensington Steel Co., Chicago, succeeding the late Walter S. McKee, whose death was reported in THE IRON AGE of May 29. Mr. Bauer, who formerly was vice-president, was one of the founders of the Kensington company and for many years had been associated with Mr. McKee. KENNETH JENSON, formerly general manager, has been made vice-president and general manager.

A. R. MATHIESON, director of welfare work for the Carnegie Steel Co., Pittsburgh, has been elected president of the Pittsburgh Personnel Association.

GUISEPPE FACCIOLI, associate manager of the Pittsfield, Mass., works of the General Electric Co. and chief consulting engineer, associated with the company for 25 years, has resigned owing to ill health. He is an Italian by birth, received his college and technical training in that country, and came here in 1902. In 1904, Mr. Faccioli became designing engineer for the Crocker-Wheeler Co., and later was associated with the Stanley Electric Mfg. Co., which was absorbed by the General Electric Co. in 1907.

## S. A. E. Nominations Announced

Vincent Bendix, president Bendix Aviation Corporation, Chicago, is the nominee for the presidency of the Society of Automotive Engineers for 1931, according to an announcement made during the summer meeting of the society, which was held at French Lick Springs Hotel, French Lick, Ind., May 25 to 29.

Councilors selected by the nominating committee are: Frederick S. Duesenberg, Norman G. Shidle and Charles E. Tilston.

Candidates selected to serve as vice-presidents in charge of the various divisions of the society are: Dr. G. W. Lewis, representing aircraft engineering; Arthur Nutt, representing aircraft engine engineering; W. F. Joachim, Diesel engine engineering; John A. C. Warner, passenger car engineering; Carl B. Parsons, passenger car engine engineering; and F. K. Glynn, transportation and maintenance engineering. Vice-presidents to represent the motor truck and motor coach engineering and the production engineering divisions have not yet been nominated.

C. W. Spicer, vice-president Spicer Mfg. Co., Plainfield, N. J., is the nominee for treasurer.

## Blast Furnace and Coke Oven Meeting

The Eastern States Blast Furnace and Coke Oven Association will hold its annual meeting and election of officers at the Meadowbrook Golf and Country Club, Clarence, N. Y. (near Buffalo), on Friday, June 6. There will be the usual two round-table conferences, both at 10 a. m.

Blast furnace round table, John T. Whiting, chairman. Subjects: Utilization of Blast Furnace Gas; Use of Open-Hearth Slag in the Blast Furnace; Relation of Top Design to Flue Dust Losses.

Coke oven round table, William R. Pendry, chairman. Subjects: Possible Variation in Coke Oven Operation to Conserve Gas; What Is the Effect of Coal Washing on Coke Structure?; Dry Quenching of Blast Furnace Coke.

There will be a reception at Lafayette Hotel, Buffalo, on the evening of June 5. All other sessions, luncheon and dinner will be at the country club at Clarence.

Air Reduction Sales Co. has moved from 342 Madison Avenue, New York, to 60 East Forty-second Street.

## America Produces More High-Grade Manganese

While an imposing number of manganese deposits is named and located in Information Circular No. 6274 of the Department of Commerce ("Selected Bibliography and Map of Manganese Deposits of the United States") statistics issued at the same time show that the bulk of the American ore containing 35 per cent manganese or over comes from Butte, Mont.

Shipments of such metallurgical ore from Montana in 1929 were 29,945 gross tons, as compared with 12,044 tons in 1928. In 1929 the plant of the Domestic Manganese & Development Co. treated in its mill 47,025 gross tons of rhodochrosite, averaging about 37.6 per cent of manganese and recovered 29,041 long tons of sinter averaging about 57.8 per cent of manganese. In 1928 it treated 18,595 gross tons of rhodochrosite and recovered 11,118 tons of sinter.

Total American production in 1929, for the first time since 1925, shows a substantial increase, due chiefly to the above mentioned operation. Comparative figures follow:

	Number of Shippers	Long Tons	Value	Value per Ton
Domestic Production:				
1929.....	34	47,597	\$1,036,199	\$21.40
1928.....	35	31,430	593,561	18.90
Importations:				
1929.....	..	664,269	8,450,818	12.70
1928.....	..	427,708	5,395,949	12.60

## Welding Electrode for Thin Sheet

A welding electrode—or rather welding wire for the carbon arc process—is being marketed by Lincoln Electric Co., Cleveland, under the trade name "Lightweld." It is 1/16 in. in diameter, and is adaptable on sheet from 16 to 22 gage, either for lap, butt or corner welds. When correctly used with 5/32-in. carbon electrode, 30 to 60-amp. direct current and with work attached to positive terminal, a dense weld, free from pin holes, may be made at speeds from 7 to 18 in. per minute, depending upon the type of joint (lap, corner or butt), gage of the material, the set-up or

tightness of the joint before welding and the skill of the operator.

In operation the carbon in a holder should be held in one hand and the "Lightweld" wire in the other. The latter should be held directly over the seam, with its end against the sheet. The position of the other end should be fairly close to the work, so that the wire at the weld lies fairly flat and does not rise too abruptly from the weld; an angle of about 15 deg. to the sheet is about right. The carbon electrode should be held at an angle of about 60 deg. to the sheet and pointed in the direction of the welding, and the arc kept at such length that there is a continuous bead of molten metal from rod to crater.

## Prices and Unfilled Orders of Non-Ferrous Ingots

Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended April 25.

As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item in reality including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

	Cents
Commercial 80-10-10 (1 per cent impurities) .....	15.199
Commercial 78 per cent metal....	13.139
Commercial 81 per cent metal....	13.692
Commercial 83 per cent metal....	13.739
Commercial 85-5-5-5 .....	13.817
Commercial No. 1 yellow brass ingot .....	11.656

On May 1 unfilled orders for brass and bronze ingots and billets on the books of the members of the institute amounted to 8773 net tons. This compares with 7537 tons on April 1, with 8821 tons on March 1, with 9630 tons on Feb. 1 and with 9578 tons on Jan. 1.

## Mileage Freight Rates for Scrap Are Suggested

WASHINGTON, June 3. — Carload rates on scrap iron and steel from points in Central territory, including the Illinois rate district, and the factors east of Chicago and the Mississippi River in the rates from Western trunk line territory to Kokomo, Ind., will be reduced to 70 per cent of the basic scale prescribed in the general iron and steel rate case if the Interstate Commerce Commission adopts a modified report by Examiner F. A. Clifford, made public yesterday. Originally, the examiner held that the rates should not exceed 80 per cent of the sixth class rates.

The complainant, the Continental Steel Corporation, sought and was given further hearing with the result that the report was modified. The report also suggested the appropriateness of fixing rates on scrap iron and steel on the basis of a distance and added that railroads should readjust their rates on scrap between other points in Central territory in line with the Continental Steel decision.

## Obituary

E. D. GREEN, president and founder of the Garden City Fan Co., Chicago, died on May 29. He established the company in 1879.

FORD MCAVOY, general superintendent of the St. Louis Gas & Coke Corporation, Granite City, Ill., died suddenly on the evening of May 27 as he was going to his home from a nearby playground, where he had been playing baseball. He was 36 years old.

FRANK H. TRUAX, for many years associated with the Simmons Co., New York, as director in charge of traffic and service, died May 28 at his home in New York, aged 58 years. He was a native of Kenosha, Wis., and took up his residence in New York when the general offices of the Simmons Co. were transferred from Kenosha to New York about 10 years ago.

CHARLES W. MOUCH, formerly president of the Pan American Bridge Co., Newcastle, Ind., and an organizer of the Indiana Rolling Mill Co., died at his home following an illness of several months. He was 66 years old.

HENRY D. BOOTH, former vice-president of the Midvale Steel Co., died at his home in Germantown, Philadelphia, on May 29, aged 70 years. He was born at New Castle, Del., and after his graduation from the Naval Academy at Annapolis, he entered the employ of the Midvale company, with which he remained until his retirement in 1922.

## Steel Boilers and Foundry Equipment Orders and Canadian Automobiles

	April, 1930	March, 1930	April, 1929
Steel boilers ordered (a), number.....	1,017	972	1,706
do. heating surface, sq. ft. ....	1,070,093	1,261,646	1,769,427
Foundry equipment orders (b).....	(c)122.8	164.1	172.6
do. shipments .....	(d)274.8	194.5	220.3
do. unfilled orders.....	244.1	411.1	363.4
Canadian automobile production: (e)...	24,257	20,730	41,901
do. four months .....	70,923	.....	135,310
do. passenger cars.....	19,926	15,960	.....
do. trucks .....	777	1,011	.....
do. chassis .....	3,547	3,749	.....
do. taxicabs .....	7	10	.....

- (a) United States Department of Commerce.  
 (b) Foundry Equipment Manufacturers Association: the figures are index numbers based on average monthly shipments of 1922-1924 as 100.  
 (c) Lowest since July, 1928.  
 (d) Highest in more than three years.  
 (e) Dominion Bureau of Statistics, Ottawa.

W. W. MACON  
Editor

# THE IRON AGE

A. I. FINDLEY  
Editor Emeritus

ESTABLISHED 1855

## Instalment Buying in a Depression

WHEN the stock market crash came the comment was made that instalment selling would undergo an acid test. The deferred payment plan, it was stated, would prove its soundness or weakness by the manner in which it weathered a period of business depression. To be sure, the instalment method had been used in the sale of certain consumer goods for many years, but never before had it been so widely applied. The pervasiveness of the plan is indicated by the high ratios of instalment sales to total sales for the following commodities:

	Percentage Sold on Payments
Automobiles .....	75
Washing machines .....	80
Vacuum cleaners .....	75
Pianos .....	70
Jewelry .....	35
Radios .....	85
Furniture .....	85-90
Gas stoves .....	70

One fear was that defaults would run high and that repossessions would swamp manufacturers with used goods difficult to resell. This apprehension, at least, does not seem to have been justified. Another source of concern was the belief that instalment buying was overdone, putting excess stocks in consumers' hands—a surplus that is just as much of a burden on business as swollen inventories in the hands of manufacturers and distributors.

It is a question whether there was much overbuying on the basis of wage earnings in 1929, but naturally part-time work or unemployment this year has made it more difficult to make instalment payments, and the necessity for meeting those obligations has no doubt forced a curtailment of new purchases. Reduced employment, rather than the deferred payment plan itself, appears to be the cause of the trouble.

In the face of current speculation regarding the ultimate effects of the instalment plan, the American Radiator Co. has adopted that method as a means of alleviating business depression. Residential building, on which that manufacturer depends so largely, is in a cyclical slump, but there remains a large market in the modernization of existing homes. On May 1, this company inaugurated an intensive campaign, outlined elsewhere in this issue, to sell radiator and boiler installations to householders having other forms of heating equipment. The success of the plan, in the opinion of those who conceived it, depends on the financing. To carry the instalment paper a separate financing company, a subsidiary of the American

Radiator & Standard Sanitary Corporation, has been formed.

## Why Has Steel Scrap Declined?

REFERENCE was made in our issue of March 27 to the relatively high price of steel scrap then prevailing. Recent declines have quite altered the picture. Ten weeks ago our composite scrap price, made up of heavy melting steel at Philadelphia, Pittsburgh and Chicago, while under the level of a year previous, was above the levels of both two years and three years previous. With declines reported last week in all three markets the composite dropped to the lowest since early 1922, barring a few weeks in the summer of 1928, when soon afterward it was clearly apparent the market had gone down too far. Dealers had to take heavy losses on their short sales.

There is a reason for everything and we are not charging that scrap has done something erratic or improper. Rather an effort should be made to find out what conditions the market is reflecting. Scrap has always been a sensitive commodity, fluctuating more in percentage of price, usually even in dollars a ton, than either pig iron or finished steel products.

In the old days it used to fluctuate so violently that dealers could make profits by storing scrap in their yards, bought in prepared form, buying toward the end of a decline and selling as the subsequent peak was being approached. Lately the fluctuations, with increased freights and labor costs, have not sufficed for this, dealers' stocks being made of scrap they prepare themselves and therefore must have in their yards. Still, the fluctuations have been rather large relative to pig iron and finished steel.

Comparison should be made by percentages. Averaging the last three calendar years, the scrap composite of THE IRON AGE in dollars a gross ton was 31.4 per cent of the finished steel composite in dollars a net ton. Last week the ratio was down to 30.2 per cent.

If the market has been logical, it would seem this is an interpretation of conditions as subnormal. Is that really the case? The rate of steel production now, at the beginning of June, is below that of a year ago, but it is distinctly above the June rate of either 1928 or 1927. As a matter of fact, it is above the June rate in any year prior to 1929.

There ought to be pretty fair consumptive support to the scrap market. Looking at the other side, the outcome of scrap, one sees nothing like special activity. The automobile industry, a large scrap pro-

ducer, is not running particularly well, and the largest automobile company has a steel mill of its own. There is much construction work involving fabricated structural steel, but it is largely new work, not involving tearing down old steel-bearing structures in proportions frequently observed in the past. The railroads are producing much scrap, but they have been doing that for several years.

Evidently the explanation lies in pig iron, the steel companies using a larger proportion of pig to scrap than for some time past. They have their blast furnaces and by-product coke ovens, with heavy capital charges, and they want to keep them working.

### American Wages and "Comforts"

WE take no hazard in saying that J. G. Pearce of Birmingham, England, who at the recent convention of foundrymen at Cleveland read the annual exchange paper from the Institute of British Foundrymen, is better qualified to speak on foundry practice than on the relative economic status of British and American workmen. Interviewed by a daily paper, Mr. Pearce is thus quoted on the results of our tariff rates as affecting wages and living costs:

The cry of high tariff advocates in America is, "Protect the high wages in America from low wages of Europe." But what do your high wages mean? They mean simply this—high rent, high prices for food, clothing and commodities.

In England, a free trade country, where wages, from the standpoint of dollars, are lower than in this country, the workers live more sanely and have more comforts and luxuries than American workers.

So your high tariff does not protect the working people at all. It only stimulates an artificial high standard of living which puts the worker under a constant strain to maintain.

Mr. Pearce, it will be seen, makes a clean sweep of what students of actual conditions in the two countries, in identical industries, have commonly dealt with by citing facts in detail. American visitors at British iron and steel and engineering works, who have seen housing conditions there and have had a chance to appraise the scale on which workers' families live, will be greatly surprised to learn that, on 40 to 50 per cent of the American wage, dwellers in these communities "have more comforts and luxuries than American workers." A highly interesting exhibit could be made, for example, with photographs of the automobile parking spaces at metal-working plants yonder and here.

We are sure that not a few of Mr. Pearce's own countrymen, who came over in 1926 to find out why wages here were so much higher than in Great Britain and why manufacturing communities here so continuously enjoyed prosperity, would take issue with him. Members of the London *Daily Mail* party that visited the United States in that year, and of the British Government Labor Mission that toured the country a few months later, left quite a different impression. In referring to the materially higher wages in the United States they spoke of the higher standard of living here, "the cost of which somewhat re-

duces the difference." That is quite a different thing from saying that British workers "have more comforts and luxuries than American workers."

In a paper read before the Iron and Steel Institute at London in September, 1927, T. W. Robinson, vice-president of the Illinois Steel Co., Chicago, dealt with economic and social changes affecting wage earners in the American steel industry. He showed that in 23 representative industries the earnings of workers in this country increased 115 per cent between 1914 and 1925, while living costs of workers' families rose 68 per cent. British manufacturers who commented on the paper at the institute meeting pointed to the fact that with an average of  $4\frac{1}{2}$  horsepower behind every manufacturing wage earner in the United States the large output per worker here, in comparison with the average in Great Britain, was not surprising. As a sample of British trade union restrictions one of these speakers said that while a bricklayer there may not lay more than 500 bricks a day, American building contractors would not have a man on the job who laid less than 2000.

It was once the vogue to turn all comparisons of British and American labor conditions into discussions of protection and free trade; but that is true no longer. The subject reduces to much simpler terms than the tariff affords. British workers receive less than American workers chiefly for the reason that they produce much less per man. Thus there is much less to divide, and their scale of living is correspondingly inferior.

### Setbacks in Industries and Shares

ONE assumes, of course, that the United States makes progress in the volume of its industrial production and in the value of its industries, the latter being measured by the market value of shares, subject to fluctuations on account of the human element. When there are declines, therefore, it helps us get our bearings to observe how long in point of time is the setback. In a general way the time setback is much longer in industry than in the stock market.

As to industry the setback is about five years, according to the Federal Reserve Board's index of industrial production. The sum of the board's indices for the first three months of each year is shown below:

#### Production Indices (First Quarter of Each Year)

1923.....	303	1927.....	325
1924.....	303	1928.....	325
1925.....	316	1929.....	352
1926.....	319	1930.....	314

In point of volume the setback is about 7 per cent, from a general trend line constructed on the basis of normal or average annual increase.

In steel alone the setback, broadly speaking, may be placed at anywhere from two to four years. Production so far this year has been well above the same period of 1925, but the next three years showed so little variation that it is making rather a fine point to pick out which of the three years should be taken, to say whether we are back to 1928, to 1927 or to 1926.

In the stock market, utilities are back to the middle of 1929, industrials to late 1928 and railroads to their high point in the second quarter of that year. The decline that began seven months ago has been so impressive that our perspective may be altered and we

may improve it by reminiscence of what was being said before any of the times just mentioned.

In the first place one notes that, since the country returned to a gold basis in 1879, a half-century ago, there were ten well-defined bull markets in shares through that of 1922-3. Their average duration was 24 months, the shortest being 19 months and the longest 27 months. In 1924 another bull market began. In 1926 there was scarcely any advance and there is room for difference of opinion whether there have been two bull markets since 1924 or only one.

About two years ago it looked as if we were in a second, beginning early in 1927. But now in the retrospect there is ground for holding that the market that collapsed recently began in the summer of 1924, whereby it would be given a duration of more than five years, as compared with the conventional two years indicated by ten bull movements over the space of half a century. If we take it that there have been two movements, the second lasted nearly three years, which would still be record-breaking.

Thus the stock market has had only a short set-

back in point of time. The rails have had the longest setback, but even on April 1, 1928, they had not risen to the point to which they have lately declined. What were men saying at that time?

A stock broker's circular regularly written in somewhat optimistic vein said, March 31, 1928, that the shake-out in a certain stock "is interpreted in some quarters as the first warning tremor that the speculative structure is in a position to be toppled over." A week later it was said "a selling movement of any proportion could easily cause a mild stampede to unload" and that bad news seemed to have little effect on the market. On April 15, 1928, Colonel Ayres showed that ten leading industrials were selling to yield only 3.52 per cent, and said "One most important result of a period of higher interest rates will be to calm down the speculative excesses in stock market speculation, and that seems inevitable and not far off."

Viewed from the longer perspective, then, the stock market has not had much of a decline after all. It is at levels which, two years and more ago, many would have thought decidedly high.

## CORRESPONDENCE

### Usefulness of Cast Iron

*To the Editor:* A letter from J. F. Lincoln was published in the May 15 issue of THE IRON AGE commenting on the writer's article, "Cast Iron Refuses to Step Aside," which appeared in the May 1 issue.

The author of the letter takes exception to the statements made regarding the uses made of cast iron because of its high compressive strength. It is true that most castings are subjected to both compression and tension stresses, but it is also true that in many of them those in compression are the greater. The fact is that cast iron is being used very satisfactorily in bases and beds for heavy machinery and structures.

The comments on the tensile strength of cast iron were quite unexpected. A great majority of the foundries operating today, which are producing castings that require strength, are pouring iron regularly that will show a tensile strength of over 25,000 lb. per sq. in. There are ample data to substantiate this.

In paragraph eight the letter states "Experience has shown that if a higher strength than 15,000 lb. per sq. in. in tension is used, dangerous results are encountered." The dangerous results that might occur are not due to the cast iron but due to the fact that the casting user and engineer are not so careful as they should be in setting up the proper specifications for the castings they buy. If the casting user and engineer will join with the foundrymen in setting up the proper standards and specifications according to the uses to which the castings are to be put, the dangerous results will be eliminated. There are many castings in which the major requirements are not strength and therefore lower strength irons are used to advantage, which is in itself sufficient reason why specifications should be set up where strength is required.

In the last paragraph appears the statement, "The greatest handicap that cast iron has is the fact that it must be made from patterns, cores, and in foundries where the cost must of necessity be very high." It is true, castings cannot be made without the use of patterns, cores, etc., but that certainly does not constitute a handicap, as

castings of all kinds must use the same means. This statement evidently infers a comparison of cast iron castings and fabricated steel, and even on this basis, considering the wastage of material in fabrication and the investment necessary in punches, shear, rolls, welding and riveting equipment, etc., cast iron castings are still the cheaper in most cases. This is certainly true for quantity production.

The field of usefulness for cast iron is expanding, not narrowing, as a result of recent improvement of properties and practices, and the wise casting user is familiarizing himself with this progress and profiting thereby.

O. W. POTTER.

University of Minnesota, Minneapolis.

### Hails the Promise of Alloy Irons

*To the Editor:* I wish to take exceptions to parts of three articles: May 1, O. W. Potter, "Cast Iron Refuses to Step Aside"; May 15, J. F. Lincoln, "Economic Field of Cast Iron"; May 22, C. H. Hughes, "Cast Iron of High Tensile Strength."

In all uses of cast iron, the designer must always limit himself to the general characteristics of the iron as they apply to the particular work at hand. As commonly used, gray cast iron is notoriously low in tensile strength, high in compressive strength, and of a varying degree of brittleness. It also has the very questionable characteristic of porosity, which may or may not occur at some point where great need for strength is considered the principal constituent of the design and where extra sections are allowed to obtain that strength; also in conformity to what is considered the best practice, extra large fillets may have been used. At these points, porosity, occasioned by shrinkage in cooling, may show in a manner that will cause very good qualities or characteristics of the metal to be overlooked or condemned. In these sections the tensile strength has been known to average below 2000 lb. and the compressive strength to be lowered to approximately nihil, because of the brittleness of the metal in adjacent sections coupled with a crumbling action of the porous section.

The addition of nickel alone or better still nickel and chromium will cause most of these faults to disappear. If, again, copper is added to the nickel and chromium it

## The Week in Business

Drift of Current Financial  
and Economic Opinion

**N**OT long now, is the estimate of Alexander Hamilton Institute as to the beginning of a genuine business revival. Study of a dozen recessions in the past 40 years shows that they lasted, on the average, about 13 months. This one has now reached ten months and present outlook is that its length will not greatly exceed the previous average. After the seasonal dullness of June and July "the beginning of a revival may materialize at any time."

But a caution is sounded. We must not expect a rapid improvement. "The rise from the present level . . . is likely to require a considerable time." The recovery in three recessions most resembling this one took 13, 15 and 19 months—an average of 16 months—in reaching a normal level. Hence: "Despite the probable improvement during the latter part of this year, it is doubtful whether business men will consider business generally good before 1931. . . ."

### Recovery to Be Slow

"A normal volume of business may not be reached before the middle of next year. Sufficient improvement, however, should have occurred by the beginning of next year to give the situation a fairly cheerful aspect."

This slowness of recovery is noted by a banking house, which places the low point in last Decem-

ber, "with the trend since then upward but at a rate . . . of less than usual seasonal proportions." The opinion is here expressed that, though demand for goods is reduced, purchasing power is not similarly restricted. Contrast is made between the *power* to buy and the *will* to buy, and the increase in savings is cited to lend point to the distinction.

### Money on the Side of the Optimist

Ease in money conditions in May is regarded by the Harvard Economic Society as "a dominant feature of the economic situation." That organization expects continuance of this condition, which has resulted in large security flotations "of the type leading to construction or to improvement of plant and equipment, and therefore favorable to business."

While no sustained firmness has appeared in commodity prices, "the greater stability evident in the past two weeks suggests that the period of uncertainty . . . will soon come to an end."

Diverging opinions are not wanting. The National Industrial Conference Board expects the general level of business activity to return to normal by autumn. It regards the disturbed conditions and diminished purchasing power of foreign markets as the present "most unfavorable influence on trade prospects. . . . Recovery

. . . should be more rapid here than in those commercial nations more dependent upon foreign trade."

Less slackening of the seasonal sort than might fairly be expected is noted by *Annalist*, which "suspects that present output of steel is not far from being that of a normal year, although 4,000,000 tons below that in the first five months of the boom year 1929."

*Commerce and Finance* thinks that "President Hoover's faith cure was not a complete success in averting a business depression, but it must be admitted that its effect has been encouraging and that its constructive influence is commencing to be evident."

A favorable outlook for business is summarized by Julius S. Barnes, chairman of the National Business Survey Conference, as based upon three main factors:

1—Large American industry continues to carry out the construction program agreed upon last December.

2—Continued large capital improvements supported by large-scale financing evidence a confidence in enlarged future earning power and preparation for it.

3—There is evidence, both here and in Europe, of increasing reservoirs of accumulated credit, with consequent decreases in interest rates and resulting benefits for production and distribution.

seems to accentuate the influence of the other two metals with but one weak characteristic, which is that the compressive strength is lowered slightly. But let it go; we do not need it in designs. Still, in turn, it reduces the brittleness range and adds greatly to the shearing and torsional strength by giving elasticity to the metal in a small degree.

Cast iron that contains nickel and chromium can be cast to give 60,000 lb. tensile in some sections and can be relied upon to give 28,000 lb. in all sections. If, however, copper be added, the tensile strength of the favorable sections may be immediately raised to 85,000 lb. and, because it seems to resist the forming of porous sections, will show 45,000 lb. tensile in those parts where gray irons would actually show but 2000 lb.

In the specific case mentioned by Mr. Lincoln, where we would have compressive action in the top and tensile action in the lowest section of the member, we cannot rely upon the compressive strength at all. Brittleness here is our enemy and must of necessity be guarded against.

It is here that steel shows its real value, but to those makers of mechanical contrivances where castings have been the rule, and where patterns have been made, in one sense it involves a great shrinkage in visible plant valuations to scrap the patterns and entails so much new design and experimenting to attain that happy point where, with

welded steel, our troubles would be over, that it would indeed be a very aggressive general manager who would countenance any immediate change.

For that reason the coming of the alloy cast irons is a boon for the trade as a progressive medium between the new (all steel welded design) and the old (gray cast iron design) that must be accepted by all designers and used to every possible advantage, for just at the present time we seem to be at a transformation period where it is not always of best advantage to accept the new entirely or to leave the old too abruptly.

Cast iron has had its best period. Cast steel does not seem to fill the bill in any sense, therefore many of us are turning our eyes toward Mr. Lincoln's child, welded steel. Mr. Lincoln has paved the way for us to start. Some of us would tread further on the way did we know just how far the paving went and which way the road turned when future developments in both iron and steel have been brought to that point where some one can discover a specific cleavage line and say, to that side lies the future, definite and clear. On the other hand improvements in cast irons may render void much of good that we now see in the steel of today and thus bring us to a point where welding may not seem the cure all that it does at present for some of our troubles.

C. G. WILLIAMS

Green Bay Barker Machine & Tool Works, Chief Engineer  
Green Bay, Wis.

# Iron Output Decreased in May

Daily Rate Lost 1779 Tons or 1.7 Per Cent From April—  
Net Loss of Three Furnaces

**R**EDUCTION in daily pig iron output developed last month for the first time this year. The decline was 1.7 per cent as against an increase of 1½ per cent in April.

Production of coke pig iron in May was 3,232,760 gross tons or 104,283 tons per day for the 31 days. In April the output was 3,181,868 tons or 106,062 tons per day for 30 days. The decline in May was therefore 1779 tons per day or 1.7 per cent. It was the third largest this year and just under the March rate of 104,715 tons per day. It compares with 125,745

tons per day in May, 1929, the largest rate on record.

If comparisons are made with other periods, it is found that the May daily rate is the smallest for that month since May, 1925, when it was 94,542 tons. For the first five months the production this year was 15,327,183 tons. This is 14.5 per cent less than the 17,923,735 tons for the same five months last year. It is only a little under the 15,438,921 tons to June 1, 1928.

The net loss in furnaces was three for May—four blown in and seven

shut down. This compares with seven blown in and nine shut down in April with a net loss of two. Previous to April and May there were gains each month this year.

## Operating Rate on June 1

There were 180 furnaces active on June 1 with an estimated operating rate of 103,425 tons, comparing with 104,770 tons per day for the 183 furnaces active on May 1.

Of the four furnaces blown in last month, two were Steel Corporation and two were independent steel com-

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1926—Gross Tons

	1926	1927	1928	1929	1930
Jan. ....	106,974	100,123	92,573	111,044	91,209
Feb. ....	104,408	105,024	100,004	114,507	101,390
Mar. ....	111,032	112,366	103,215	119,822	104,715
Apr. ....	115,004	114,074	106,183	122,087	106,062
May ....	112,304	109,385	105,931	125,745	104,283
June ....	107,844	102,988	102,733	123,908	.....
½ year ...	109,660	107,351	101,763	119,564	.....
July ....	103,978	95,199	99,091	122,100	.....
Aug. ....	103,241	95,073	101,180	121,151	.....
Sept. ....	104,543	92,498	102,077	116,585	.....
Oct. ....	107,553	89,810	108,832	115,745	.....
Nov. ....	107,890	88,279	110,084	106,047	.....
Dec. ....	99,712	86,960	108,705	91,513	.....
Year ...	107,043	99,266	103,382	115,851	.....

Pig Iron Production by Districts, Gross Tons

	May (31 days)	April (30 days)	March (31 days)	Feb. (28 days)
New York and Mass. ....	215,704	225,752	219,033	184,985
Lehigh Valley .....	76,699	85,179	93,999	82,465
Schuylkill Valley .....	46,752	53,216	64,727	64,708
Lower Susq. and Leba- non Valley .....	42,915	43,173	38,984	36,524
Pittsburgh district .....	677,743	663,679	670,100	576,427
Shenango Valley .....	72,570	67,106	68,309	63,825
Western Pennsylvania .....	106,875	120,415	124,410	107,210
Maryland, Va. and Ky. ....	112,233	120,786	133,005	109,587
Wheeling district .....	168,365	156,170	116,715	106,896
Mahoning Valley .....	280,193	264,319	282,667	251,262
Central and North'n Ohio .....	284,849	275,700	313,805	264,110
Southern Ohio .....	48,264	48,463	49,410	44,502
Illinois and Indiana .....	719,328	682,171	694,759	613,915
Mich., Minn., Mo., Wis., Colo. and Utah .....	144,381	140,186	129,392	116,505
Alabama .....	234,289	233,972	245,875	215,999
Tennessee .....	1,600	1,581	981	.....
Total .....	3,232,760	3,181,868	3,246,171	2,838,920

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
May, 1929 .....	100,174	25,571	125,745
June .....	99,993	23,915	123,908
July .....	98,044	24,056	122,100
August .....	98,900	22,251	121,151
September .....	95,426	21,159	116,585
October .....	93,644	22,101	115,745
November .....	83,276	22,771	106,047
December .....	68,152	23,361	91,513
January, 1930 .....	71,447	19,762	91,209
February .....	81,580	19,810	101,390
March .....	83,900	20,815	104,715
April .....	85,489	20,573	106,062
May .....	84,310	19,973	104,283

\*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

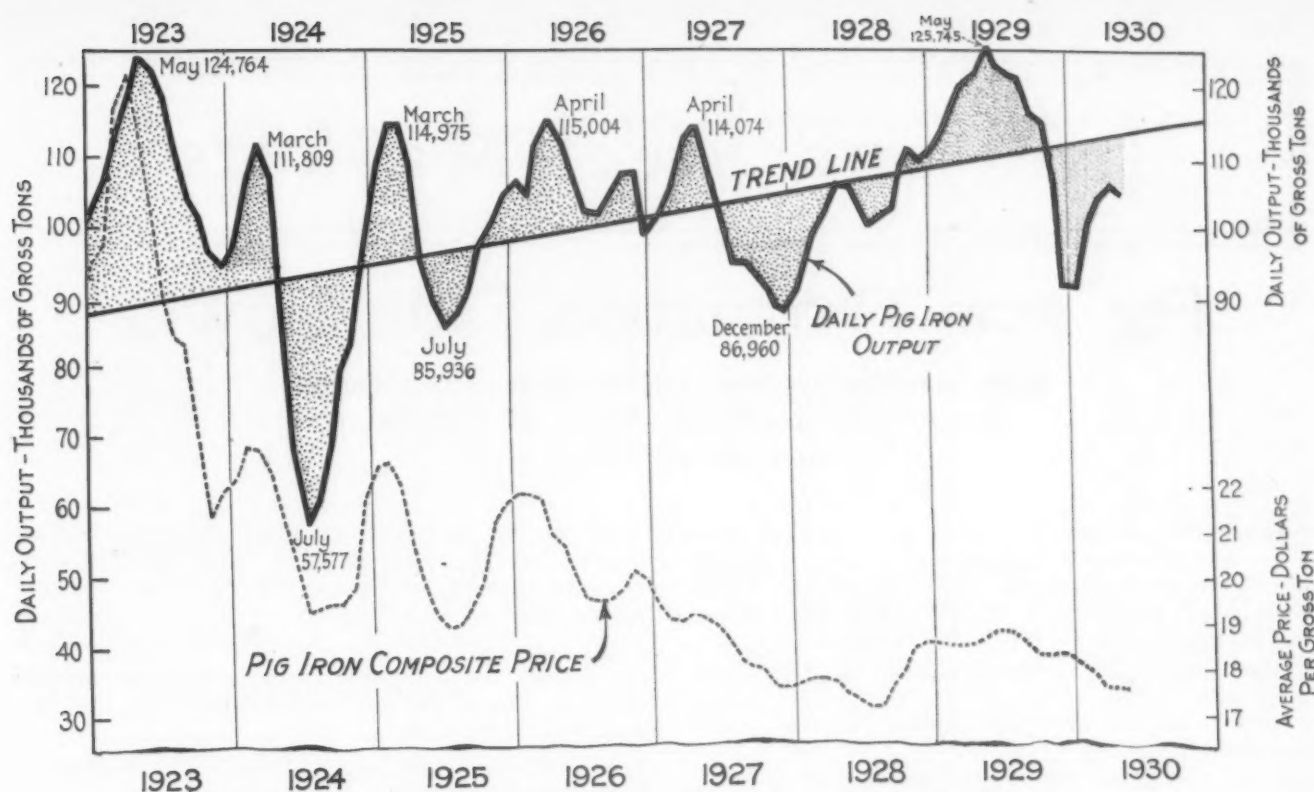
	June 1		May 1	
	Number in Blast	Rate of Operation	Number in Blast	Rate of Operation
New York:				
Buffalo .....	11	5,875	11	5,900
Other N. Y. and Mass. ....	3	1,080	3	1,110
New Jersey .....	0	.....	0	.....
Pennsylvania:				
Lehigh Valley .....	5	2,225*	6	2,840*
Schuylkill Valley .....	3	1,510	3	1,670
Susquehanna Valley .....	2	1,290	2	1,345
Ferromanganese .....	1	95	1	90
Lebanon Valley .....	0	.....	0	.....
Ferromanganese .....	0	.....	0	.....
Pittsburgh District .....	32	21,230	33	21,070
Ferro. and Spiegel .....	3	510	3	595
Shenango Valley .....	4	2,345	4	2,235
Western Pennsylvania .....	6	3,070	6	3,285
Ferromanganese .....	2	380	2	395
Maryland .....	4	2,800	5	3,360
Wheeling District .....	8	5,430	8	5,340
Ohio:				
Mahoning Valley .....	15	9,515	14	8,810
Central and Northern .....	16	9,600	15	9,005
Southern .....	4	1,555	4	1,615
Illinois and Indiana .....	32	22,400	33	22,920
Mich., Wis. and Minn. ....	6	2,960	6	2,870
Colo., Mo. and Utah .....	3	1,310	4	1,800
The South:				
Virginia .....	1	260	1	245
Kentucky .....	1	380	1	420
Alabama .....	16	7,470	16	7,685
Ferromanganese .....	1	85	1	110
Tennessee .....	1	50	1	55
Total .....	180	103,425	183	104,770

\*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1928—Gross Tons

	1928	1929	1930
Jan. ....	2,869,761	3,444,370	2,827,464
Feb. ....	2,900,126	3,206,185	2,838,920
Mar. ....	3,199,674	3,714,473	3,246,171
Apr. ....	3,185,604	3,662,625	3,181,868
May .....	3,283,856	3,598,082	3,232,760
5 months .....	15,438,921	17,923,735	15,327,183
June .....	3,082,000	3,717,225	.....
½ year .....	18,520,921	21,640,960	.....
July .....	3,071,824	3,785,120	.....
Aug. ....	3,136,570	3,755,680	.....
Sept. ....	3,062,314	3,497,564	.....
Oct. ....	3,373,806	3,588,118	.....
Nov. ....	3,302,523	3,181,411	.....
Dec. ....	3,369,846	2,836,916	.....
Year* .....	37,837,804	42,285,769	.....

\*These totals do not include charcoal pig iron. The 1929 production of this iron was 138,193 gross tons.



Daily Production So Far in 1930 Is Roughly 10 Per Cent Under Theoretical Needs

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 1,275,000 tons

many stacks. The seven furnaces shut down were as follows: Five credited to independent steel companies and two to the Steel Corporation. No merchant furnaces were blown in or out.

#### Loss in Steel-Making Iron

A small loss was made in steel-making iron—84,310 tons per day for May as against 85,489 tons for April, a loss of 1.3 per cent. In merchant iron there was also a small loss—19,973 tons per day in May as compared with 20,573 tons daily in April.

#### Large Ferromanganese Output

A new high for this year in ferromanganese was made in May at

30,296 tons. The next largest this year was 27,777 tons in April. The May total is the largest since the 31,866 tons last November.

#### Furnaces Blown In and Out

Four furnaces were blown in during May as follows: No. 4 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; one furnace of the Otis Steel Co. and one furnace of the National Tube Co. in northern Ohio, and No. 3 Iroquois furnace of the Youngstown Sheet & Tube Co. in the Chicago district.

Among the furnaces blown out or banked during May were the following: One furnace at the Bethlehem plant of the Bethlehem Steel Corpora-

tion in the Lehigh Valley; No. 4 Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; one furnace at the Sparrows Point plant of the Bethlehem Steel Corporation in Maryland; the Betty furnace of the Republic Steel Corporation in central Ohio; one furnace of the Wisconsin Steel Co. and one Gary furnace in the Chicago district, and one furnace of the Colorado Fuel & Iron Co. in Colorado.

Link-Belt Co., Crane and Shovel Division, 300 West Pershing Road, Chicago, announces the appointment of the following companies as its direct representatives for the sale of these machines: W-D-M Equipment Co., Columbia, S. C.; Myer & Cunningham, 30 Church Street, New York; Barzee Equipment Co., Syracuse, N. Y.; S. G. Hawkins Co., Houston, Tex.; Lewis-Patten Co., San Antonio, Tex.; West Virginia-Kentucky Hardware & Supply Co., Huntington, W. Va.

Charles A. Carpenter has opened an office in the Park Building, Pittsburgh, to represent the Buffalo Foundry Machine Co. in sales of hydraulic machinery; the rubber mill department of the Erie Foundry Co., Erie, Pa.; the Kent Owens Machine Co., Cleveland; the Porter-Cable Machine Co., Syracuse, N. Y.; the Cincinnati Lathe & Tool Co., Cincinnati, and the Wickes Boiler Co., Saginaw, Mich.

#### Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1928	1929	1930	1928	1929	1930
Jan. ....	2,155,133	2,651,416	2,214,875	22,298	28,208	27,260
Feb. ....	2,274,880	2,498,901	2,284,234	19,320	25,978	21,310
Mar. ....	2,588,158	2,959,295	2,600,980	27,912	24,978	23,345
Apr. ....	2,555,500	2,826,028	2,564,681	18,405	22,413	27,777
May ....	2,652,872	3,105,404	2,613,628	29,940	25,896	30,296
5 months ....	12,226,543	14,041,044	12,278,398	117,875	127,473	129,998
June ....	2,448,905	2,999,798	.....	32,088	33,363	.....
½ year.....	14,675,448	17,040,842	.....	149,963	160,836	.....
July ....	2,464,896	3,039,370	.....	32,909	31,040	.....
Aug. ....	2,561,904	3,065,874	.....	24,583	28,461	.....
Sept. ....	2,477,695	2,862,799	.....	22,278	27,505	.....
Oct. ....	2,729,589	2,902,960	.....	23,939	31,108	.....
Nov. ....	2,654,211	2,498,291	.....	29,773	31,866	.....
Dec. ....	2,647,863	2,112,704	.....	28,618	28,564	.....
Year .....	30,211,606	33,522,840	.....	312,063	339,380	.....

\*Includes output of merchant furnaces.

# Iron and Steel Markets

## Pig Iron Production Rate Lower

Daily Average Declines 1.7 Per Cent—Ingot Output  
Recedes Another Point—Heavy Melting Scrap  
Advances at Pittsburgh

**P**IG IRON production in May was 3,232,760 tons, or 104,283 tons a day, compared with 3,181,868 tons or 106,062 tons a day in April. The decline of 1779 tons, or 1.7 per cent, in the daily average was not unexpected, in view of the recent trend of steel output and current indications of a seasonal contraction in demand.

A net loss of three active blast furnaces, seven having been put out as against four lighted, is corroborative evidence that operations are in a downswing, though obviously not a sharp one.

The fact that the month's output was the smallest for any May since 1925 and production for the first five months was  $14\frac{1}{2}$  per cent below the performance for the corresponding period in 1929 suggests the possibility that the summer recession may not be severe.

Although present market conditions seem to offer little hope for any slackening in the downward tendency of production before August or September, heavy melting steel scrap at Pittsburgh, always regarded as an important barometer, has made the first upturn since the middle of February, advancing 50c. a ton.

To this good omen may be added the observation that finished steel prices, although still weak, are steadier than a week or two ago and steel ingot output, while showing wide variations among different companies and producing districts, averages 72 per cent for the country at large, a decline of only 1 point from the 73 per cent rate of a week ago.

Continued expansion of pipe line business, the placing of additional ship steel and a large volume of reinforcing bar business are the bright spots in the current market situation. Contracts for 250,000 tons of steel for a double pipe line from the Texas Panhandle to Chicago are now being closed, and the Phillips Petroleum Co. has doubled its recent order for 350 miles of 10-in., raising the amount of steel required to 75,000 tons.

Thirty thousand tons of plates and shapes has been bought by the New York Shipbuilding Corporation for two vessels to be built for the United States Lines. The Newport News Shipbuilding & Dry Dock Co. is low bidder on two ships for the Eastern Steamship Lines, calling for a total of 10,000 tons of plates and shapes.

Among the minor outlets for steel, the radio industry shows signs of taking a turn for the better after having been virtually idle since the first of the year. One important Eastern maker of receiving sets has started production for the fall and winter market and two others plan to do so July 1.

Structural steel awards, after showing improvement of late, are unusually light. At 23,000 tons, they compare with 31,000 tons in the previous week and 51,000 tons two weeks ago.

Tin plate production continues at 75 to 80 per cent of capacity, but shipments from tin mills so far this year have run 10 per cent behind those of the first five months of 1929.

Automobile output appears to have passed its peak. The Chevrolet company is reported to have reduced its schedules for June and the Ford Motor Co. is ordering less steel, although still maintaining its recent operations.

Steel specifications from both the railroads and the railroad equipment builders are steadily diminishing. The Illinois Central is slow in taking action on its inquiry for 2265 freight cars, the only pending business of consequence in the equipment market.

The automotive industry continues to press for additional concessions in steel prices, but the past week has brought out no further open breaks in the market. On the other hand, pig iron is 50c. a ton lower in eastern Michigan and at Chicago, where water shipments from Lake Erie furnaces have accentuated competition.

Neither steel nor pig iron consumers are evincing much interest in third quarter requirements. Stocks of pig iron in the hands of melters would be considered small in a period of active business, but with operations sharply curtailed it is likely that considerable metal will be carried over into the last half of the year.

Cast iron pipe shops, the largest melters of foundry pig iron, are fairly busy, with Northern plants running at 75 per cent of capacity and Southern companies on a 60 per cent basis. A Virginia pipe maker has bought 13,000 tons of pig iron. By way of contrast, the schedules of radiator and sanitary ware manufacturers are extremely light.

The advance in heavy melting scrap at Pittsburgh is the only upward price revision of that grade in the entire country. The exceptional character of the change is emphasized by further reductions of 50c. a ton at Cleveland and Birmingham and 25c. at St. Louis. Yet it is not unusual for the most important scrap market to lead the way for other centers.

THE IRON AGE composite price for pig iron has declined from \$17.58 to \$17.50 a ton, a new low for the year. Twelve months ago it was \$18.71. The finished steel composite, unchanged at 2.214c. a lb., compares with 2.412c. a year ago.

## A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:					Finished Steel,				
	June 3, 1930	May 27, 1930	May 6, 1930	June 4, 1929		June 3, 1930	May 27, 1930	May 6, 1930	June 4, 1929
No. 2 fdy., Philadelphia.....	\$19.76	\$19.76	\$20.26	\$21.76	<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
No. 2, Valley furnace.....	18.50	18.50	18.50	18.50	Sheets, black, No. 24, P'gh...	2.55	2.55	2.55	2.85
No. 2 Southern, Cin'ti.....	16.69	16.69	16.69	18.69	Sheets, black, No. 24, Chicago	2.65	2.65	2.65	3.05
No. 2, Birmingham.....	14.00	14.00	14.00	15.00	dist. mill.....	3.20	3.20	3.30	3.60
No. 2 foundry, Chicago*.....	18.50	19.00	19.00	20.00	Sheets, galv., No. 24, P'gh...	3.30	3.30	3.40	3.80
Basic, del'd eastern Pa. ....	18.75	18.75	18.75	20.25	Sheets, galv., No. 24, Chicago	2.15	2.15	2.15	2.35
Basic, Valley furnace.....	18.50	18.50	18.50	18.50	dist. mill.....	2.25	2.25	2.25	2.45
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	20.76	Wire nails, Pittsburgh.....	2.15	2.15	2.15	2.65
Malleable, Chicago*.....	18.50	19.00	19.00	20.00	Wire nails, Chicago dist. mill	2.20	2.20	2.20	2.70
Malleable, Valley.....	19.00	19.00	19.00	19.00	Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.50
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04	Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.55
Ferromanganese, furnace ...	94.00	94.00	94.00	105.00	Barbed wire, galv., P'gh.....	2.80	2.80	2.80	3.30
<b>Rails, Billets, etc., Per Gross Ton:</b>					Barbed wire, galv., Chicago	2.85	2.85	2.85	3.35
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00	dist. mill.....	2.85	2.85	2.85	3.35
Light rails at mill.....	36.00	36.00	36.00	36.00	Tin plate, 100-lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.35
Re-rolling billets, Pittsburgh..	31.00	31.00	31.00	36.00	<b>Old Material, Per Gross Ton:</b>				
Sheet bars, Pittsburgh.....	31.00	31.00	33.00	36.00	Heavy melting steel, P'gh...\$15.25	\$14.75	\$15.75	\$18.25	
Slabs, Pittsburgh.....	31.00	31.00	33.00	36.00	Heavy melting steel, Phila...	13.00	13.00	13.50	16.00
Forging billets, Pittsburgh...	37.00	37.00	38.00	41.00	Heavy melting steel, Chicago	12.25	12.25	12.75	15.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00	Car wheels, Chicago.....	13.75	13.75	14.00	14.50
Cents Cents Cents Cents					Car wheels, Philadelphia.....	14.50	14.50	15.00	16.00
Skelp, grvd. steel, P'gh, lb....	1.70	1.70	1.80	1.85	No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	15.00
<b>Finished Steel,</b>					No. 1 cast, Philadelphia.....	14.00	14.00	14.00	16.50
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents	No. 1 cast, Ch'go (net ton)...	12.75	12.75	13.25	15.00
Bars, Pittsburgh.....	1.75	1.75	1.75	1.95	No. 1 RR. wrot., Phila. ....	15.00	15.00	15.00	16.00
Bars, Chicago.....	1.85	1.85	1.85	2.05	No. 1 RR. wrot., Ch'go (net)	10.50	11.00	11.25	14.00
Bars, Cleveland.....	1.75	1.75	1.80	1.95	<b>Coke, Connellsville,</b>				
Bars, New York.....	2.08	2.08	2.09	2.29	<i>Per Net Ton at Oven:</i>				
Tank plates, Pittsburgh.....	1.70	1.70	1.75	1.95	Furnace coke, prompt.....	\$2.50	\$2.50	\$2.60	\$2.75
Tank plates, Chicago.....	1.80	1.80	1.85	2.05	Foundry coke, prompt.....	3.50	3.50	3.50	3.75
Tank plates, New York.....	1.98	1.98	2.02½	2.22½	<b>Metals,</b>				
Structural shapes, Pittsburgh	1.70	1.70	1.75	1.95	<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Structural shapes, Chicago...	1.80	1.80	1.85	2.05	Lake copper, New York.....	13.12½	13.12½	13.12½	18.12½
Structural shapes, New York	1.90½	1.95½	1.94½	2.19½	Electrolytic copper, refinery..	12.75	12.75	12.25	17.75
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30	Tin (Straits), New York.....	30.12½	31.75	32.00	43.62½
Hot-rolled strips, Pittsburgh..	1.70	1.70	1.70	1.90	Zinc, East St. Louis.....	4.65	4.62½	4.65	6.55
Cold-rolled strips, Pittsburgh	2.45	2.45	2.55	2.75	Zinc, New York.....	5.00	4.97½	5.00	6.90
					Lead, St. Louis.....	5.40	5.40	5.35	6.80
					Lead, New York.....	5.50	5.50	5.40	7.00
					Antimony (Asiatic), N. Y. ...	7.25	7.35	7.50	8.87½

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

## PITTSBURGH Heavy Melting Scrap Advances—Line Pipe Business Features Steel Trade

PITTSBURGH, June 3.—Heavy melting steel scrap, which has been declining from a peak of \$19 in August, 1929, except for a moderate and brief rise in February of this year, has taken a turn for the better, with an advance to a range of \$15 to \$15.50 from \$14.50 to \$15 a week ago. The advance was brought about by heavy buying by at least three mills, totaling about 50,000 tons.

This large buying is interpreted in some quarters as a move toward stabilizing prices of finished steel, which have developed no further weakness. In some lines a slight interest in third quarter requirements has developed, but mills are reluctant to open their books for that period. Although efforts toward the stabilization of steel selling prices are believed to be in the making, any advance which might occur is not likely to have much, if any, effect on shipments during the next three months.

Line pipe business is still the center of interest in the steel market. The Phillips Petroleum Co., which last

week was reported as having placed 350 miles of 10-in. gasoline-carrying pipe, has tentatively doubled this order, and the business has been split between two Valley makers in a five to two ratio. Confirmation of the placing of another huge gas line from the mid-continent fields to Chicago and Detroit is not forthcoming, and pipe makers believe that oil and gas companies which placed one line covering that territory a few weeks ago will make no commitments on another project this year.

With Pittsburgh and Valley pipe mills booked at practical capacity on seamless, lap-weld and electrically welded pipe, the effect that this tonnage will have on steel-making operations during the summer is being studied with interest. It is generally conceded that pipe mill requirements will do a great deal to hold up the steel ingot output of the larger companies which have pipe capacity. Smaller mills, with more limited lines, may break down the average considerably. For instance, two

fairly large non-integrated producers in this district are currently running less than 25 per cent of their open-hearth furnaces, and Valley sheet mills in the aggregate are engaged this week at only slightly above 50 per cent. In direct contrast to this, two other small independent companies in the Pittsburgh area are running their open-hearths at 90 to 100 per cent, as compared with a general average in Pittsburgh and nearby districts of about 70 per cent. Finishing mill operations are just as variable, and the three-day holiday over the week-end was widely utilized as an excuse for limiting production last week.

The status of the leading steel consuming industries served by Pittsburgh mills has not changed materially, although shipments to automobile makers are falling off slightly. Both the railroads and railroad equipment builders are specifying as lightly as possible. The reinforcing bar business during May approached record proportions, indicating activity

in certain types of building, but the extremely light schedules of radiator and sanitary ware and standard pipe makers offer convincing proof of the depressed position of the building industry in general.

**Pig Iron.**—With May shipments of merchant pig iron generally under production during that period, further curtailment in output is planned. The Davison Coke & Iron Co. will blow out or bank its Cherry Valley stack on June 6, leaving only one Shenango and the Struthers furnace operating in the Valleys. A considerable portion of the output of one of these furnaces is required for an ingot mold plant, while the other has been on low phosphorus iron for several weeks. The local Pittsburgh stack will continue to operate. Steel companies in this district are also selling iron, although principally on a reciprocity basis in deals which are given little publicity in the merchant market.

Prevailing quotations of \$18.50, Valley, on foundry and basic iron, and \$19 on malleable and Bessemer continue to represent the market in that territory, although shading is admitted at points where outside competition is encountered. Likewise, Valley furnaces are quite willing to meet the lower delivered prices in the Pittsburgh area, which the local producer is able to make through freight rate advantage, even though its base quotation is 50c. over the Valley price.

The Union Steel Casting Co. is reported to have placed a small tonnage of Bessemer iron in the last week. Otherwise, sales have been confined to small lots, with general inquiry largely lacking.

*Prices per gross ton, f.o.b. Valley furnace:*  
Basic .....\$18.50  
Bessemer ..... 19.00  
Gray forge ..... 18.00  
No. 2 foundry..... 18.50  
No. 3 foundry..... 18.00  
Malleable ..... 19.00  
Low phos., copper free...\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

*Prices per gross ton, f.o.b. Pittsburgh district furnace:*  
Basic .....\$19.00  
No. 2 foundry..... 19.00  
No. 3 foundry..... 18.50  
Malleable ..... 19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

**Heavy melting steel scrap rises 50c. a ton on large buying by three mills.**

\* \* \*

**Efforts to stabilize steel prices at present levels expected. No further price weakness has developed.**

\* \* \*

**Pipe line tonnage continues center of interest in steel trade.**

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**Finishing mill and open-hearth operations very low in some instances.**

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**Shipments to the automobile industry are falling off slightly.**

**Semi-Finished Steel.**—Recent price weakness in billets, slabs and sheet bars has not been so pronounced in the immediate Pittsburgh territory as in Youngstown and Cleveland, and most sellers call the market \$32 on the general run of business. It is admitted, however, that \$31, Pittsburgh, has been done in some cases, and the market remains quotable at \$31 to \$32 on the three principal unfinished products. Lower prices have not stimulated business, and shipments during May, although somewhat heavier than in the preceding month, were generally light. Forging billets are quotable at \$37, Pittsburgh, no sales at lower figures being reported.

**Bars, Plates and Shapes.**—Business during May showed little improvement, except on reinforcing bars and structural shapes. Plate tonnage reaching local mills is very light, with the principal consumers specifying only in small tonnages and little new business coming into the market. There is practically no activity in barges or other river craft, and the railroad car builders are steadily reducing their requirements. Recent activity in line pipe will react unfavorably upon the plate business, particularly in the case of gasoline-carrying lines, wide introduction of

which will reduce tank car requirements.

Merchant bars are very slow, specifications from the automobile industry beginning to show a decline. While this may be offset later in the month by introduction of new models, it is a disturbing factor at the moment. Cold finishers, which ordinarily take large bar tonnages, have not been running at more than 60 per cent of the 1929 volume, although some of them report shipments in the first five months comparable to the corresponding period of 1928. Demand for reinforcing bars is fully equal to that of previous years, and May business reached record proportions for some companies. Deliveries are usually made in two to three weeks, but this time would undoubtedly be greatly extended if demand for merchant bars were in like proportion. The George Westinghouse memorial bridge at East Pittsburgh, requiring 1750 tons, is reported placed, and the general contract has been awarded for the new Chesapeake & Ohio Railroad piers at Newport News, Va., which will require a large tonnage of bars.

The market on steel bars is holding fairly well at 1.75c., Pittsburgh. Hardly so much can be said for plates and shapes, now quotable at a range of 1.70c. to 1.75c. Weakness in the Eastern territory has had a depressing effect on this market, and shading of minimum figures is not uncommon when a significant tonnage is involved.

**Tubular Goods.**—Operations of lap-weld and seamless mills in this and the Valley districts are being rapidly stepped up following the recent placing of large orders, and all of the available capacity for this material will soon be active. No new lines were reported placed during the week, but tentative additions are said to have been made to projects already awarded.

The Phillips Petroleum Co., reported last week to have closed on 350 miles of 10-in. gasoline-carrying pipe, is now said to have placed additional tonnage, the entire order involving 700 miles. Two Valley producers shared in this business.

Demand for oil country goods is very light, but warehouse stocks in the

## THE IRON AGE Composite Prices

### Finished Steel

June 3, 1930, 2.214c. a Lb.

One week ago..... 2.214c.  
One month ago..... 2.228c.  
One year ago..... 2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.214c., May 20
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

### Pig Iron

June 3, 1930, \$17.50 a Gross Ton

One week ago.....\$17.58  
One month ago..... 17.67  
One year ago..... 18.71

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	\$18.21, Jan. 7;	\$17.50, June 3
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

Soft Steel		Base per Lb.
F.o.b. Pittsburgh mill.....	1.75c.	
F.o.b. Chicago.....	1.85c.	
Del'd Philadelphia.....	2.04c.	
Del'd New York.....	2.08c.	
F.o.b. Cleveland.....	1.75c. to 1.80c.	
F.o.b. Lackawanna.....	1.85c. to 1.90c.	
F.o.b. Birmingham.....	1.95c. to 2.00c.	
C.i.f. Pacific ports.....	2.35c.	
F.o.b. San Francisco mills.....	2.35c.	

## Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.....	1.75c. to 1.80c.
F.o.b. P'gh mills, cut lengths.....	2.00c. to 2.05c.
F.o.b. Birmingham, mill lengths.....	1.95c. to 2.00c.

## Rail Steel

F.o.b. mills, east of Chicago dist.....	1.65c. to 1.70c.
F.o.b. Chicago Heights mill.....	1.75c.
Del'd Philadelphia.....	1.94c. to 1.99c.

## Iron

Common iron, f.o.b. Chicago.....	1.90c.
Refined iron, f.o.b. P'gh.....	2.75c.
Common iron, del'd Philadelphia.....	2.09c.
Common iron, del'd New York.....	2.14c.

## Tank Plates

Base per Lb.	
F.o.b. Pittsburgh mill.....	1.70c. to 1.75c.
F.o.b. Chicago.....	1.80c.
F.o.b. Birmingham.....	1.95c. to 2.00c.
Del'd Cleveland.....	1.88½c.
Del'd Philadelphia.....	1.90½c. to 1.95½c.
F.o.b. Coatesville.....	1.80c. to 1.85c.
F.o.b. Sparrows Point.....	1.80c. to 1.85c.
F.o.b. Lackawanna.....	1.80c. to 1.85c.
Del'd New York.....	1.98c. to 2.03c.
C.i.f. Pacific ports.....	2.20c.

## Structural Shapes

Base per Lb.	
F.o.b. Pittsburgh mill.....	1.70c. to 1.75c.
F.o.b. Chicago.....	1.80c.
F.o.b. Birmingham.....	1.95c. to 2.00c.
F.o.b. Lackawanna.....	1.80c. to 1.85c.
F.o.b. Bethlehem.....	1.80c. to 1.85c.
Del'd Cleveland.....	1.88½c.
Del'd Philadelphia.....	1.81c. to 1.86c.
Del'd New York.....	1.90½c. to 1.95½c.
C.i.f. Pacific ports.....	2.35c.

## Hot-Rolled Hoops, Bands and Strips

Base per Lb.	
6 in. and narrower, P'gh.....	1.80c.
Wider than 6 in., P'gh.....	1.70c.
6 in. and narrower, Chicago.....	1.90c.
Wider than 6 in., Chicago.....	1.80c.
Cooperage stock, P'gh.....	2.10c. to 2.20c.
Cooperage stock, Chicago.....	2.20c. to 2.30c.

## Cold-Finished Steel

Base per Lb.	
Bars, f.o.b. Pittsburgh mill.....	2.10c.
Bars, f.o.b. Chicago.....	2.10c.
Bars, Cleveland.....	2.10c.
Bars, Buffalo.....	2.10c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 3.40c.
Strips, P'gh.....	2.45c. to 2.55c.
Strips, Cleveland.....	2.45c. to 2.55c.
Strips, del'd Chicago.....	2.73c. to 2.83c.
Strips, Worcester.....	2.60c. to 2.70c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	3.80c.

\*According to size.

## Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)  
To Merchant Trade

Base per Keg	
Standard wire nails.....	\$2.15 to \$2.25
Cement coated nails.....	2.15 to 2.25
Galvanized nails.....	4.15 to 4.25

Base per Lb.	
Polished staples.....	2.60c. to 2.70c.
Galvanized staples.....	2.85c. to 2.90c.
Barbed wire, galvanized.....	2.80c. to 2.90c.
Annealed fence wire.....	2.30c. to 2.40c.
Galvanized wire, No. 9.....	2.75c. to 2.85c.
Woven wire fence (per net ton to retailers).....	\$65.00

## To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage.....	2.30c.
Spring wire.....	3.30c.

(Carload lots, f.o.b. Chicago)

Wire nails.....	\$2.20 to \$2.30 (keg)
Annealed fence wire.....	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade.....	2.35c.

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

## Cut Nails

Per 100 Lb.	
Carloads, Wheeling, Reading or Northumberland, Pa.....	\$2.45 to \$2.50
Less carloads, Wheeling or Reading.....	2.60

## Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.10c. to 2.20c.
No. 10, blue annealed, del'd Phila.....	2.32c. to 2.42c.
No. 10, blue annealed, B'ham.....	2.20c.

## Sheets

Blue Annealed		Base per Lb.
No. 13, f.o.b. P'gh.....	2.15c.	
No. 13, f.o.b. Chicago dist.....	2.25c. to 2.35c.	
No. 13, del'd Philadelphia.....	2.44c. to 2.54c.	
No. 13, blue annealed, B'ham.....	2.35c.	

## Continuous Mill Sheets

No. 10 gage, f.o.b. P'gh.....	1.80c. to 1.90c.
No. 13 gage, f.o.b. P'gh.....	1.95c. to 2.05c.

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled		Base per Lb.
No. 24, f.o.b. Pittsburgh.....	2.55c.	
No. 24, f.o.b. Chicago dist. mill.....	2.65c.	
No. 24, del'd Philadelphia.....	2.84c.	
No. 24, f.o.b. Birmingham.....	2.70c.	

## Steel Furniture Sheets

No. 24, f.o.b. P'gh.....	3.80c.
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## Galvanized

No. 24, f.o.b. Pittsburgh.....	3.20c. to 3.30c.
No. 24, f.o.b. Chicago dist. mill.....	3.30c. to 3.40c.
No. 24, del'd Cleveland.....	3.43½c.
No. 24, del'd Philadelphia.....	3.49c.
No. 24, f.o.b. Birmingham.....	3.40c.

## Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.75c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill.....	2.90c. to 3.00c.

## Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	3.70c.
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## Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	3.80c.
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## Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.80c.
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## Tin Plate

Per Base Box	
Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

## Terne Plate

(F.o.b. Morgantown or Pittsburgh)  
(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$10.70	25-lb. coating I.C.\$15.90
15-lb. coating I.C. 13.40	30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60	40-lb. coating I.C. 18.80

## Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.		Alloy Differential
S.A.E. Series	Numbers	
2000 (¼% Nickel)	.....	\$0.25
2100 (1¼% Nickel)	.....	0.65
2300 (3½% Nickel)	.....	1.60
2500 (5% Nickel)	.....	2.25
3100 Nickel Chromium	.....	0.65
3200 Nickel Chromium	.....	1.35
3300 Nickel Chromium	.....	3.80
3400 Nickel Chromium	.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	.....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	.....	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	.....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	.....	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	.....	0.45
5100 Chromium Spring Steel.....	.....	0.20
6100 Chromium Vanadium Bar.....	.....	1.20
6100 Chromium Vanadium Spring Steel.....	.....	0.95
9250 Silicon Manganese Spring Steel (flats).....	.....	0.25
.....	.....	0.50
.....	.....	1.50
.....	.....	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¼c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

## Rails

Per Gross Ton	
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

## Track Equipment

Base per 100 Lb.	
Spikes, ½ in. and larger.....	\$2.80
Spikes, ¼ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.07½

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

## Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Iron	
Inches	Black	Inches	Black
1/8.....	47	1/8 and 3/16.....	+11 +36
1/4 to 3/8.....	53	1/2.....	23 5
1/2.....	58	3/4.....	28 11
3/4.....	62	1 and 1 1/4.....	31 15
1 to 3.....	64	1 1/2 and 2.....	35 18
Lap Weld			
2.....	57	45 1/2.....	23 9
2 1/2 to 6.....	61	49 1/2.....	2 1/2 to 3 1/2 28 13
7 and 8.....	58	45 1/2.....	4 to 6..... 30 17
9 and 10.....	56	43 1/2.....	7 and 8..... 29 16
11 and 12.....	55	42 1/2.....	9 to 12..... 26 11
Butt Weld, extra strong, plain ends			
1/8.....	43	26 1/2.....	1 1/4 and 3/8..... +13 +48
1/4 to 3/8.....	49	32 1/2.....	1/2..... 23 7
1/2.....	55	44 1/2.....	3/4..... 28 12
3/4.....	60	49 1/2.....	1 to 2..... 34 18
1 to 1 1/2.....	62	51 1/2.....	
2 to 3.....	63	52 1/2.....	
Lap Weld, extra strong, plain ends			
2.....	55	44 1/2.....	2..... 29 13
2 1/2 to 4.....	59	48 1/2.....	2 1/2 to 4..... 34 20
4 1/2 to 6.....	58	47 1/2.....	4 1/2 to 6..... 33 19
7 to 8.....	54	41 1/2.....	7 and 8..... 31 17
9 and 10.....	47	34 1/2.....	9 to 12..... 21 8
11 and 12.....	46	33 1/2.....	

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2 1/2 in.....	38	1 1/2 in.....	1
2 1/2 in.—2 3/4 in.....	46	1 3/4 in.....	8
3 in.....	52	2 in.—2 1/4 in.....	13
3 1/2 in.—3 3/4 in.....	54	2 1/2 in.—2 3/4 in.....	16
4 in.....	57	3 in.....	17
4 1/2 in. to 6 in.....	46	3 1/2 in. to 3 3/4 in.....	18
		4 in.....	20
		4 1/2 in.....	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

## Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.....	61
1 1/4 to 1 1/2 in.....	58
1 1/2 in.....	37
2 to 2 1/4 in.....	32
2 1/4 to 2 1/2 in.....	40
3 in.....	52
3 1/2 to 3 3/4 in.....	54
4 in.....	57
4 1/2, 5 and 6 in.....	40

## Hot Rolled

2 and 2 1/2 in.....	38
2 1/2 and 2 3/4 in.....	46
3 in.....	52

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

Per Cent Off List	
Carbon, 0.10% to 0.30% base (carloads).....	55
Carbon, 0.30% to 0.40% base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

producing districts have been worked off to a large extent, and more small rush orders are going through. Standard pipe shows little change, with current shipments running as much as 25 per cent under normal. Mechanical tubing has felt the effects of the lighter June specifications of the two leading automobile makers, and movement of boiler tubes is only fair.

**Wire Products.**—A few consumers of manufacturers' wire have begun to show interest in their third quarter requirements, although makers' books are not yet open for that period. Most of them are willing to quote on such tonnage, and the prevailing quotation remains unchanged at 2.30c., Pittsburgh. If there should be a price advance, full coverage at that figure will likely be available during the third quarter. Shipments are still light, but are holding their own following some decline during the past month. Nails are quiet, with small tonnages occasionally being booked at \$2.15, Pittsburgh.

**Warehouse Business.**—Warehouse prices have declined generally in recent weeks to conform with lower mill quotations on finished steel products. Cold-finished bars and screw stock have been reduced 25c. a 100 lb. and an extra 10 per cent has been added to the discount on bolts. Bars, shapes and plates are unchanged, but prevailing quotations are being shaded in some instances. Declines in sheets have been general and nails and wire are quotably lower.

**Sheets.**—Production of sheets was lighter last week because most mills took advantage of the week-end holiday to close down and attempt to build up better schedules this week. However, the improvement is not marked, and the industry as a whole enters the new month with an average operating rate not above 65 per cent. Mills are in a position to make immediate deliveries, and are being called upon to do this frequently. In most cases the tonnages involved are light. Consumers are showing little interest in third quarter requirements, and makers are not pressing for this business. Thus far any change in the requirements of the automobile industry has been on the side of reduction. Other consuming lines are holding at about the rate which has prevailed for several weeks.

Prices are apparently more stable on the general run of business. Black sheets are fairly well maintained at 2.55c. and galvanized at 3.20c. On light plates and blue annealed material occasional shading is reported, but 2c. and 2.15c., Pittsburgh, are still representative of the market on the jobbing mill product. Continuous sheet mills are still competing rather actively for desirable tonnage, but prices under 1.80c. are exceptional, and the market remains quotable at 1.80c. to 1.90c., Pittsburgh.

**Tin Plate.**—Shipments are gradually increasing as the canning season approaches, but the heavier require-

ments of the container manufacturers are easily taken care of by anticipated tonnage accumulated by makers in the last two months. The industry as a whole is still operating at 75 to 80 per cent, but the higher figure is influenced by capacity output of Chicago plants, which are better occupied than those in the Pittsburgh and nearby districts. Shipments of tin plate in the first five months of the year are about 10 per cent behind those of the corresponding 1929 period.

**Strip Steel.**—Holiday suspensions affected strip mill operations in the last week, but hot mill capacity is engaged again this week at about 75 per cent of capacity. This is slightly higher than the general average during May, and reduced specifications in the last few days may necessitate curtailment this month. Consumers have shown occasional interest in their third quarter requirements, but specific tonnages are seldom mentioned and it is difficult to estimate the probable volume of demand during the next three-month period. Automobile makers are particularly guarded in their commitments and occasional sizable releases for use on new models do not give a dependable picture of the market.

Prices are well maintained at 1.70c., Pittsburgh, for material wider than 6 in. and 1.80c. for the narrow widths. Cold-rolled strip continues in light demand, with prices represented by a wide range when any sizable tonnages are concerned.

**Cold-Finished Steel Bars and Shafting.**—While specifications are still very light, producers find some encouragement in the fact that aggregate tonnage releases have not declined materially in spite of reduced requirements of the agricultural im-

plement manufacturers and of one or two large automobile makers. Prices are also holding well at 2.10c., Pittsburgh. One cold-finishing mill reports its business in the first five months of the year as slightly ahead of that of 1928.

**Coal and Coke.**—The coke market faces a rather unsatisfactory summer, with demand light and prices at a low level. Occasional sales of small lots of furnace coke are bringing \$2.50, Connellsville. Foundry coke is unchanged, with prices weak on the less desirable grades. The premium brands are well maintained at \$4.85 a net ton. No favorable factors are apparent in the coal market, which is seriously affected by the reduced consumption of the railroads and large industrial users. Slack is holding at recent quotations.

**Old Material.**—The scrap market, which has been declining steadily for several weeks, has been given decided support by heavy purchases by large consumers. Sales of No. 1 heavy melting steel to three mills in the last few days have totaled nearly 50,000 tons. About half this tonnage brought \$15.50 and the remainder \$15, thus clearly establishing the market at that range. Heavy buying is also reported from the Valleys at prices ranging up to \$16, and aggregate sales of 25,000 to 30,000 tons in the Detroit district have helped to clear the scrap market of surplus material.

This has brought about a situation which seems scarcely justified in view of depressed conditions in the steel industry, but which may be partly explained by the fact that a \$15 scrap market evidently offers attractive investment possibilities to the larger steel companies. The Baltimore & Ohio Railroad list brought fully \$15.50 at several points, and the Pennsylvania list, closing June 4, is expected to bring fully as much.

#### Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates .....	3.00c.
Structural shapes .....	3.00c.
Soft steel bars and small shapes ..	2.90c.
Reinforcing steel bars .....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons .....	3.35c.
Squares and flats .....	3.85c.
Bands .....	3.25c.
Hoops .....	4.25c.
Black sheets (No. 24), 25 or more bundles .....	3.50c.
Galv. sheets (No. 24), 25 or more bundles .....	4.15c.
Light plates, blue annealed (No. 10), 1 to 24 plates .....	2.85c.
Blue annealed sheets (No. 13) ..	3.00c.
Galv. corrug. sheets (No. 28), per square .....	4.03c.
Spikes, large .....	3.40c.
Small .....	2.80c. to 5.25c.
Boat .....	3.80c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.30
Wire, black, soft ann'l'd, base per 100 lb. ....	\$2.60 to \$2.70
Wire, galv. soft, base per 100 lb. ....	3.20 to 3.30
Common wire nails, per keg.	2.45
Cement coated nails, per keg	2.65 to 2.80

\*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel ..	\$15.00 to \$15.50
No. 2 heavy melting steel ..	13.00 to 13.50
Scrap rails .....	15.00 to 15.50
Compressed sheet steel .....	15.00
Bundled sheets, sides and ends .....	13.00 to 13.50
Cast iron carwheels .....	14.00 to 14.50
Sheet bar crops, ordinary ..	16.00 to 16.50
Heavy breakable cast .....	11.00 to 11.50
No. 2 railroad wrought .....	14.50 to 15.00
Hvy. steel axle turnings ..	12.50 to 13.00
Machine shop turnings .....	9.75 to 10.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers ..	18.00 to 19.00
Railr. coil and leaf springs ..	18.00 to 19.00
Rolled steel wheels .....	18.00 to 19.00
Low phos. billet and bloom ends .....	19.50 to 20.00
Low phos. mill plates .....	17.50 to 18.50
Low phos. light grades .....	17.50 to 18.50
Low phos. sheet bar crops ..	18.50 to 19.50
Heavy steel axle turnings ..	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings .....	17.50 to 18.00
Heavy steel axle turnings ..	12.50 to 13.00
Blast Furnace Grades:	
Short shoveling steel turnings .....	10.00 to 10.50
Short mixed borings and turnings .....	10.00 to 10.50
Cast iron borings .....	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles .....	21.50 to 22.50
Cupola Grades:	
No. 1 cast .....	14.00 to 14.50
Rails 3 ft. and under .....	17.00 to 17.50

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

Billets and Blooms		Sheet Bars		Skelp	
Per Gross Ton		(Open Hearth or Bessemer)		(F.o.b. Pittsburgh or Youngstown)	
		Per Gross Ton		Per Lb.	
Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00 to \$32.00	Pittsburgh	\$31.00 to \$32.00	Grooved	1.70c. to 1.80c.
Rerolling, 4-in. and under 10-in., Youngstown	31.00 to 32.00	Youngstown	31.00 to 32.00	Universal	1.70c. to 1.80c.
Rerolling, 4-in. and under 10-in., Cleveland	31.00 to 32.00	Cleveland	31.00 to 32.00	Sheared	1.70c. to 1.80c.
Rerolling, 4-in. and under 10-in., Chicago	34.00	Slabs		Wire Rods	
Forging quality, Pittsburgh	37.00	(8 in. x 2 in. and under 10 in. x 10 in.)		(Common soft, base)	
		Per Gross Ton		Per Gross Ton	
		Pittsburgh	\$31.00 to \$32.00	Pittsburgh	\$36.00
		Youngstown	31.00 to 32.00	Cleveland	36.00
		Cleveland	31.00 to 32.00	Chicago	37.00

## Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports		Per Gross Ton		Fluorspar	
Per Gross Ton				Per Net Ton	
Old range Bessemer, 51.50% iron	\$4.80	Domestic, 80%, seaboard	\$94.00 to \$99.00	Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
Old range non-Bessemer, 51.50% iron	4.65	Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00	No. 2 lump, Illinois and Kentucky mines	20.00
Mesabi Bessemer, 51.50% iron	4.65	Spiegeleisen		Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
Mesabi non-Bessemer, 51.50% iron	4.50	Per Gross Ton Furnace		Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	32.50
High phosphorus, 51.50% iron	4.40	Domestic, 19 to 21%	\$31.00 to \$34.00	Fire Clay Brick	
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit	Domestic, 16 to 19%	29.00 to 32.00	Per 1000 f.o.b. Works	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	12.00c.	Electric Ferrosilicon		High-Heat Intermediate Duty Brick Heavy Duty Brick	
Iron ore, low phos., Swedish, average 68% iron	12.00c.	Per Gross Ton Delivered		Pennsylvania	\$43.00 to \$46.00 \$35.00 to \$38.00
Iron ore, basic Swedish, average 65% iron	10.00c.	50%	\$83.50	Maryland	43.00 to 46.00 35.00 to 38.00
Manganese ore, washed 52% manganese, from the Caucasus	30.00c.	75%	130.00	New Jersey	50.00 to 65.00
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.	Per Gross Ton Furnace		Ohio	43.00 to 46.00 35.00 to 38.00
Tungsten ore, high grade, per unit, in 60% concentrates	\$14.00 to \$16.50	10%	\$35.00	Kentucky	43.00 to 46.00 35.00 to 38.00
Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00	11%	37.00	Missouri	43.00 to 46.00 35.00 to 38.00
Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	.50c. to .55c.	12%	34.00	Illinois	43.00 to 46.00 35.00 to 38.00
Coke		Bessemer Ferrosilicon		Grand fire clay, per ton	7.00
Per Net Ton		F.o.b. Jackson County, Ohio, Furnace		Silica Brick	
Furnace, f.o.b. Connellsville prompt	\$2.50	Per Gross Ton		Per 1000 f.o.b. Works	
Foundry, f.o.b. Connellsville prompt	\$3.25 to 4.75	6%	\$22.00	Pennsylvania	\$43.00
Foundry, by-products, Ch'go ovens	8.00	7%	22.50	Chicago	52.00
Foundry, by-products, New England, del'd	11.00	8%	23.00	Birmingham	50.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40	9%	24.00	Silica clay, per ton	\$8.50 to 10.00
Foundry, by-product, Phila.	9.00	10%	25.00	Magnesite Brick	
Foundry, Birmingham	5.00	Other Ferroalloys		Per Net Ton	
Foundry, by-product, St. Louis, f.o.b. ovens	8.00	Ferrotungsten, per lb. contained metal del'd	\$1.30 to \$1.40	Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Foundry by-prod., del'd St. Louis	9.00	Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.	Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Coal		Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65	Standard size	45.00
Per Net Ton		Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00	Chrome Brick	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75	Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00	Per Net Ton	
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75	Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton	\$122.50	Standard size	\$45.00
Gas coal, 1/4-in. f.o.b. Pa. mines	1.90 to 2.00				
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75				
Steam slack, f.o.b. W. Pa. mines	90c. to 1.10				
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25				

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
Per 100 Pieces		Per Cent Off List		(1/4-in. and smaller)	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)				Per Cent Off List	
Machine bolts	.73	Semi-finished hexagon nuts	.73	F.o.b. Pittsburgh	70, 10 and 5
Carriage bolts	.73	Semi-finished hexagon castellated nuts, S.A.E.	.73	F.o.b. Cleveland	70, 10 and 5
Lag bolts	.73	Stove bolts in packages, P'gh.	.80, 10, 10 and 5	F.o.b. Chicago	70, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7 heads	.73	Stove bolts in packages, Chicago	.80, 10, 10 and 5		
Hot-pressed nuts, blank or tapped, square	.73	Stove bolts in packages, Cleveland	.80, 10, 10 and 5	Cap and Set Screws	
Hot-pressed nuts, blank or tapped, hexagons	.73	Stove bolts in bulk, P'gh.	.80, 10, 10, 5 and 2 1/4	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
C.p.c. and t. square or hex. nuts, blank or tapped	.73	Stove bolts in bulk, Chicago	.80, 10, 10, 5 and 2 1/4	Per Cent Off List	
Washers	.700c. to 6.75c. per lb. off list	Stove bolts in bulk, Cleveland	.80, 10, 10, 5 and 2 1/4	Milled cap screws	.80, 10 and 5
		Tire bolts	.60, 10 and 10	Milled standard set screws, case hardened	.80 and 5
		Discounts of 73 per cent off on bolts and nuts applied on carload business.		Milled headless set screws, cut thread	.75 and 10
		Large Rivets		Upset hex. head cap screws, U.S.S. thread	.85 and 10
		(1/2-in. and larger)		Upset set screws	.80, 10 and 5
		Base per 100 Lb.		Milled studs	.70
		F.o.b. Pittsburgh or Cleveland	\$2.90		
		F.o.b. Chicago	3.00		

\*F.o.b. Chicago, New York and Pittsburgh.  
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

# CHICAGO

## Decline in Steel Operations Seen as Sign of Summer Lull—Pig Iron Lower

CHICAGO, June 3.—This week's business is giving added evidence that the expected summer lull in orders and shipments is at hand. The change is not abrupt and may have been influenced somewhat by the holiday and in some cases the two vacation days which were observed in the week. Specifications for finished steel are only slightly under the average in May, but the drop has been sufficient to cut output several points to an average which is little, if any, above 82 per cent of capacity.

New orders are disappointingly small for the reason that so far this year sellers could depend on the first of the month as an active period of buying for the next four weeks. The thought is expressed by some that optimism or a desire to force business may have led to heavier releases than warranted by consumption. This may have led to accumulations of steel in the hands of users. If this is the case, sellers will have to stand by until this surplus, small as it is, is digested.

The recession in the rate of ingot output points to lower production of steel mill pig iron. At the moment 25 of 36 blast furnaces are in use. However, one that was banked several weeks ago may stand that way for some time, and one steel company which has no spare stack available may have to take one out for relining.

Pipe line tonnage continues to be a feature in the plate market, and structural awards are holding up remarkably well. May building in Chicago gained 80 per cent over the figure for April, but few of the structures now under way call for the use of steel.

**Pig Iron.**—Boat iron still holds the center of the stage in this market. One cargo, destined for Chicago, is now being loaded at Cleveland and in the week about 2500 tons was unloaded at Milwaukee and Chicago. Prices at which this iron is being offered are having a tendency to undermine the quotation of \$19 a ton which is being asked for Chicago-made iron.

June shipments of Northern iron are holding to the rate of late May, indicating that demand is no longer climbing as in the previous four weeks. New buying is spotty, but interest in third quarter needs is growing and indications are that a buying movement will be under way in the next week or 10 days. Users in Michigan are complaining less about business and are releasing a little more iron, which may be taken as an indication either that the melt is slowly growing, or that depleted stocks are being replenished. Prices for charcoal iron are tightening as stocks at furnaces dwindle.

### Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$18.50 to \$19.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00 to 19.50
Malleable, not over 2.25 sil.	18.50 to 19.00
High phosphorus	18.50 to 19.00
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy., sil. 1.50	18.20 to 19.01
Low phos., sil. 1 to 2, cop-per free	29.50
Silvery, sil. 8 per cent.	27.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Ferroalloys.**—A cargo of English spiegeleisen, about 900 tons, has been docked at Chicago. This tonnage was all on order and none of it is being offered in the open market. Spot buying of ferroalloys is very light. Contracts for ferromanganese, ferrochrome and ferrosilicon are for the year and therefore heavy commitments cannot be expected at this time.

**Cast Iron Pipe.**—Although this market is somewhat more active, demand is below normal for this time of year. Municipalities are slow in developing plans, and contractors could comfortably handle considerably more work than they have on their books. In this week's business are several small orders from railroads, which are worthy of note because little tonnage has come from the railroads so far this year. Newark, Ohio, has ordered 100 tons from an unnamed bidder, and Hammond, Ind., has closed for 200 tons of 4- to 16-in. class D pipe with an unnamed maker. The American Cast Iron Pipe Co. has taken 250 tons for a sewage disposal plant at Galesburg, Ill.

New inquiries give little promise for the future. Chicago is in the

### Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
Under 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons and over	2.00c.
Rail steel reinforcement	1.65c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands (1/4 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes (1/4 in. and larger)	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws	60 and 10
Hot-pressed nuts, sq. tap. or blank	60 and 10
Hot-pressed nuts, hex., tap. or blank	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	\$2.75 to 2.85
Cement c'd nails, base per keg	2.75 to 2.85

market for a tonnage of special fittings. Requests for prices of cast iron pipe are confined to lots of 60 tons and less. Prices remain steady at \$37 to \$38 a ton, Birmingham, for diameters 6 in. and larger.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45 to \$46; 4-in., \$48 to \$49; Class A and gas pipe, \$3 extra.

**Rails and Track Supplies.**—The rail market is following the course it has usually taken at this time of the year. The major part of track laying programs has been completed, and backlogs have lightened to the point where rolling schedules are being scaled down rather sharply. New sales are lacking.

It is unlikely that local mills will participate in the Norfolk & Western business for the reason that freight rates are against shipment from Chicago to the points of stated destination. Rolling schedules this year called for an unusually wide spread in deliveries and this is expected to retard a secondary buying movement which might normally get under way about this time. Orders for track accessories are small and scattered and output of these commodities is tapering. An encouraging feature of this market is the fact that several railroads which have held back deliveries, in one case as long as three months, are now issuing releases and promise to expand acceptances at an early date.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07 1/2c. to 2.15c.; angle bars, 2.75c.

**Wire Products.**—Shipments of wire mill products in May were a trifle heavier than in April and compare favorably with deliveries in the fifth month of 1928. Orders from the manufacturing trade are spotty, but in the aggregate about the same as in the past three or four weeks. Sellers plan to open books for third quarter at present quotations.

Trade from the country is seasonably quiet, except in the Northwest, where conditions are reported exceptionally good from the viewpoint of the condition of this season's crops. Demand for wire rope remains dormant. Shipments of electrical wires are in good volume, but new orders are not sustaining backlogs. Wire mill operations range from 45 to 50 per cent of capacity.

**Reinforcing Bars.**—Competition in a market which remains sluggish for this time of the year continues to press down prices, especially when large tonnages are involved. The rail steel commodity is commonly being quoted as low as 1.65c. a lb. out of Chicago warehouse, and quotations on reinforcing bars made from billet stock show wide variation on lots of 100 tons or more. Fresh inquiry is

about 80 per cent of dealers' appraisal of normal, and shop operations stand between 70 and 80 per cent. Miscellaneous orders for road work continue to be placed from week to week, and there is a substantial run of business in lots of 25 tons each and smaller. New bids have been opened at Galesburg, Ill., on 1200 tons for a sewage disposal plant.

**Cold-Rolled Strip.**—Orders continue to fall off, and output has receded to 38 per cent of capacity for the industry as a whole. In some quarters it is felt that automobile manufacturers have been a bit too optimistic and, as a result, have taken in more steel than business warranted, and they are now reducing stocks at the expense of cold-rolled strip mill operations.

**Sheets.**—New orders, which under present conditions mean specifications, have been of such character that hot mills have not been able to climb above 40 per cent of capacity. The Milwaukee unit is down because of lack of business. Competition for the tonnage that is coming into the market is unusually keen and the price structure is weak, especially in the South and the Southwest.

Deliveries are prompt to the point where sellers can promise almost any grade in the time which it takes to complete the process of manufacture. Shipments of sheets to tractor builders reflect no important change in the rate of production. Container manufacturers are also reported to be sustaining a high rate of activity. A seasonable recovery in the roofing trade, which usually can be expected about this time of the year, has not developed.

*Base prices per lb., deliv'd from mill in Chicago:* No. 24 black sheets, 2.70c.; No. 24 galv., 3.35c. to 3.45c.; No. 10 blue ann'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

**Plates.**—New orders for tank construction total 10,000 tons, and fresh inquiries for like use are for 9000 tons. Of the orders placed in the week, 4500 tons will be fabricated in or near Chicago for delivery to the Southwest and 5500 tons will be sent to Western oil producing centers. The tonnage added to local plate makers' books, plus orders sent to Eastern mills, accounts for most of the tank plate tonnage which has been overhanging the market for many weeks.

The pipe line market remains active. The Ajax Pipe Line Co. plans to have in operation early in 1931 two 10-in. lines from Oklahoma fields to points near St. Louis. Shipments of plates to the Milwaukee pipe manufacturer are moving forward steadily by rail and by boat.

Specifications from car shops are lighter than would seem warranted with the amount of uncompleted business that is still on car manufacturers' books. The Illinois Central cars are active, but no definite word has come as to when they will be placed.

**Bars.**—This commodity is in good

**Evidence of summer lull in steel seen in decline in district operating rate to about 82 per cent.**

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**Competition of Lake Erie pig iron, delivered by boat, lowers prices in Chicago district.**

\* \* \*

**Pipe line tonnage continues to be the feature of the plate market.**

\* \* \*

**Otherwise, new steel orders are disappointingly small.**

\* \* \*

**Scrap prices are lower again this week, though decline is believed to have been checked.**

demand from miscellaneous users. Road machinery builders are taking steady quantities and forgers, who several weeks ago stepped up output, are holding the gains made at that time. Prices for mild steel bars are steady at 1.85c., Chicago.

Specifications for alloy steel bars from automobile manufacturers are off sharply and output has receded fully 10 points in the week. Operations in this district now average about 60 per cent of capacity.

The iron bar market is without feature. Prices for rail steel bars are off \$1 a ton to 1.75c. a lb., Chicago Heights. Specifications are in heavier volume, but demand for prompt shipment is insistent to the point where truck deliveries are becoming more numerous.

**Bolts, Nuts and Rivets.**—Third quarter contracts are being forwarded to customers at current prices. Specifications at the turn of the month were light. Shipments in May were about 30 per cent less than in the same month last year.

**Structural Material.**—New awards at 13,000 tons show marked improvement over the volume placed in the previous week. Inquiry is less impressive at 6000 tons. Railroad work accounts for 7800 tons in new orders, and highway bridge work calls for 1500 tons. Fresh inquiries for highway bridges total 1600 tons. Wisconsin so far this year has placed 3000 tons for bridges in connection with its road betterment program. Competition is at high pitch, and fabricated steel prices are being driven down.

**Coke.**—May shipments of Chicago by-product foundry coke were equal to the total in April. The price is steady at \$8 a ton, f.o.b. local ovens.

**Old Material.**—Conditions in the local scrap iron and steel market are somewhat mixed, though it is clear that weakness in prices continues.

Chicago mills have not paid above \$12.75 a gross ton, delivered, for heavy melting scrap, and a sale has been made for delivery to Gary at \$12.50. Users have turned down offers in the past few days and are now going a step farther by placing close limits on daily shipments. However, there is a feeling on the part of some dealers that there is enough strength in short orders to cause at least a check on further weakness. Offerings by railroads are large, and material bought on lists is coming on track very promptly. Brokers are buying dealers' bundles freely at \$10.50 a gross ton, delivered. This grade is coming out slowly, as yards hold a check on preparation. Cast iron borings, which offer somewhat of a gage as to activity in metal-working industries, are coming on track in smaller quantities, indicating that producers are less actively engaged. Dealers are buying tonnages at \$8, delivered, but their offers to users at \$8.50 a ton appear to be unattractive. Several shipments of scrap have been made from the St. Louis district to Chicago. Deliveries to consumers in May were fully as large as in the preceding month.

*Prices deliv'd Chicago district consumers. Per Gross Ton*

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.25 to \$12.75
Shoveling steel .....	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings.....	9.00 to 9.50
No. 1 busheling .....	10.00 to 10.50
Forg'd cast and r'd steel carwheels .....	15.25 to 15.75
Railroad tires, charg. box size .....	15.50 to 16.00
Railroad leaf springs cut apart .....	15.75 to 16.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs .....	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings .....	11.50 to 12.00
Low phos. punchings .....	13.50 to 14.00
Low phos. plates, 12 in. and under .....	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings .....	9.50 to 10.00
Cast iron borings.....	8.00 to 8.50
Short shoveling turnings..	8.00 to 8.50
Machine shop turnings....	6.50 to 7.00
Rolling Mill Grades:	
Iron rails .....	13.50 to 14.00
Rerolling rails .....	14.75 to 15.25
Cupola Grades:	
Steel rails, less than 3 ft..	14.25 to 14.75
Steel rails, less than 2 ft..	15.00 to 15.50
Angle bars, steel .....	13.50 to 14.00
Cast iron carwheels .....	13.75 to 14.25
Malleable Grades:	
Railroad .....	15.25 to 15.75
Agricultural .....	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav. ....	26.00 to 31.00

*Per Net Ton*

Rolling Mill Grades:	
Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms .....	15.00 to 15.50
Iron car axles.....	24.50 to 25.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought....	10.50 to 11.00
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	7.50 to 8.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	12.75 to 13.25
No. 1 railroad cast.....	11.25 to 11.75
No. 1 agricultural cast....	9.50 to 10.00
Stove plate .....	9.50 to 10.00
Grate bars .....	8.50 to 9.00
Brake shoes .....	8.50 to 9.00

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

# NEW YORK

## Steel Prices Steadier at Present Levels— Foundry Melt at Low Point

NEW YORK, June 3.—Foundry melt is at the lowest rate of the year and pig iron demand is correspondingly light. Stocks of iron in the hands of melters would be considered small in a period of active business, but with many foundries operating only two or three days a week it is likely that considerable metal bought for the second quarter will be carried over into the last half of the year. Sales total 6000 tons, compared with 8000 tons in the previous week. Outside of a prospective inquiry for 3500 tons of foundry iron from a district melter and 1200 tons of 0.08 per cent phosphorus iron wanted for export shipment there is no sizable business pending. The Burnham Boiler Corporation has not yet closed on its inquiry for 300 tons of foundry for Lancaster, Pa. The United States Navy is in the market for 120 tons of foundry iron for the Brooklyn, Philadelphia and Portsmouth yards—No. IX for Philadelphia and Portsmouth and 1.25 to 1.75 per cent silicon grade for Brooklyn.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91 to \$21.41
*Buff. No. 2, del'd east.	
N. J. No. 2 fdy., sil. 1.75 to 2.25	19.28 to 19.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.  
\*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

**Finished Steel.**—Steel prices seem to have steadied somewhat during the past week or two, although at extremely low levels. Among sales offices there is a growing impression that further declines are unlikely, but there is not much hope of getting a higher level until a marked improvement in demand sets in, and, with summer approaching, the time when general business gains may be looked for is frequently placed as late as September or October. The amount of structural steel business in prospect is fairly encouraging, and leading fabricators look for a gradually ascending scale of awards during the next two or three months. Structural shapes are down to 1.90½c., New York, for the average buyer, with lower quotations to large fabricators. Eastern plate mills are trying to hold the market at 1.80c., to 1.85c., Coatesville, Pa., but the lower figure is shaded \$1 a ton on attractive lots.

**Warehouse Business.**—Tonnage shipped by jobbers in May was slightly larger than that of April. Demand for structural steel from stock is still limited to small lots for alteration work. Sheet prices are slightly firmer, especially galvanized, and con-

cessions from 4.25c. a lb., base, are uncommon. Blue annealed sheets have been sold at 3.40c. to 3.60c. a lb., base, and occasionally the lower price is shaded \$1 to \$2 a ton.

**Reinforcing Bars.**—Lettings reported in the past week are light, but considerable tonnage is pending. The steel for municipal pier No. 34, North River, totaling 1700 tons, will be placed shortly. General contracts have not yet been awarded for the Jersey City piers of the Pennsylvania and Erie railroads, which will require 4000 tons and 2500 tons respectively. Price competition is still severe.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.75c. a lb., base Pittsburgh. Warehouse prices range from 2.44c. a lb., f.o.b. cars, New York, for carloads or larger lots to 3.25c. for the smallest tonnages.

**Cast Iron Pipe.**—Northern producers of pressure pipe are operating at about 75 per cent of capacity, most of the tonnage consisting of small lots of pipe for private users. Bids have been taken on 200 to 300 tons of pipe by the Board of Water Commissioners, Hartford, Conn.; Walcott Hill fire district, Wethersfield, Conn.; Rensselaer Water Co., Rensselaer, N. Y.; United States Engineering Co., New York, for Grafton, Mass., and Charles H. Tenney Co., New York, for the Springfield Gas Light Co.,

Springfield, Mass. Prices are being maintained at \$37 a net ton, foundry, on small lots, with larger tonnages sometimes quoted at about \$36.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$39.90 to \$40.90; 4-in. and 5-in., \$42.90 to \$43.90; 3-in., \$49.90 to \$50.90. Class A and gas pipe, \$3 extra.

**Coke.**—Furnace grade continues lacking in firmness, different operations in the Connellsville district quoting from \$2.40 to \$2.60 and occasionally \$2.75 a net ton, ovens. Foundry coke is quiet and the prices unchanged at:

Special brands of beehive foundry coke, \$4.85 a net ton, ovens, or \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

**Old Material.**—Transactions in scrap are limited to small lots of material. Prices paid by brokers still show a slight downward trend. Stove plate is being bought at a maximum price of \$10 a ton, delivered eastern Pennsylvania, and most brokers are buying specification pipe at \$12 a ton, delivered. No. 1 heavy melting steel is inactive, with \$13, delivered, being paid for eastern Pennsylvania mills and \$10.50, New York, or barge shipment to consumers in the Buffalo district.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	\$9.50 to \$10.50
Heavy melting steel (yard)	6.50 to 7.00
No. 1 hvy. breakable cast..	8.50 to 9.00
Stove plate (steel works)..	6.50
Locomotive grate bars....	7.00 to 7.50
Machine shop turnings....	5.50 to 6.00
Short shoveling turnings..	5.50 to 6.00
Cast borings (blast fur. or steel works).....	6.50
Mixed borings and turnings .....	5.00
Steel car axles.....	17.00
Iron car axles.....	19.50 to 20.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to 8.50
Forge fire .....	8.00
No. 1 railroad wrought...	10.00 to 10.50
No. 1 yard wrought, long..	9.00 to 9.50
Rails for rolling.....	10.00 to 10.50
Stove plate (foundry)....	8.50
Malleable cast (railroad)..	10.50 to 11.00
Cast borings (chemical)..	9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.): cupola size.....	13.00
No. 2 cast (radiators, cast boilers, etc.) .....	12.50

Modine Mfg. Co., Racine, Wis., manufacturer of copper radiation for industrial, commercial and domestic heating, has appointed the following representatives: R. M. Gunzel & Co., 1015 East Eighth Street, Los Angeles; R. F. Van Alstyne, 1034 Architects Building, Indianapolis; J. I. Krueger, 357 Ninth Street, San Francisco; E. W. Klein, 152 Nassau Street, N. W., Atlanta, Ga.; R. E. Burden, 227 Grand Avenue, Loves Park, Rockford, Ill.

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars .....	3.24c.
Iron bars, Swed. charcoal..	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard .....	4.95c.
Hoops .....	4.25c.
Bands .....	3.75c.
Blue ann'd sheets (No. 10).....	3.40c. to 3.60c.
Black sheets (No. 24*).....	3.80c. to 4.00c.
Galvanized sheets (No. 24*).....	4.25c. to 4.50c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, ½ x ¼ in. and larger..	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger .....	3.75c.
Open-hearth spring steel, bases .....	4.50c. to 7.00c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00
Tin Plate (14 x 20 in.)	
Prime .....	\$6.45
Seconds .....	\$6.20
Coke, 100 lb. base box...	A AAA
Charcoal, per Box—	
IC .....	\$9.70 \$12.10
IX .....	12.00 14.25
IXX .....	13.90 16.00

# PHILADELPHIA

## Steel Mill Operations Lower—One Blast Furnace Blown Out

**P**HILADELPHIA, June 3.—Except for the leading independent interest in this district, which is operating at slightly better than 70 per cent, operations of eastern Pennsylvania steel mills are only about 55 per cent of capacity. Consumers are operating at a still lower rate in most cases, but the radio manufacturers are preparing to begin their production programs for the year and one of the large manufacturers in this field is actively engaged. Demand for sheets, however, is still restricted.

Material for shipbuilding contracts, expected for some months by mills rolling plates and shapes, is beginning to be bought by the shipbuilders. Steel for the two vessels awarded by the United States Lines to the New York Shipbuilding Corporation, has been divided between the Bethlehem Steel Co. and the Carnegie Steel Co., each receiving about 10,000 tons of plates and 5000 tons of shapes. Further shipbuilding tonnage to be placed soon includes about 10,000 tons of plates and shapes in two ships for the Eastern Steamship Co., on which the Newport News Shipbuilding & Dry Dock Co. is low bidder.

**Pig Iron.**—Consumers of foundry iron are buying only small tonnages and are further reducing the small stocks of iron on their yards. Foundry grade is still quoted by eastern Pennsylvania furnaces at \$19 to \$19.50 a ton, furnace, while Birmingham sellers are offering foundry iron at \$12.50 a ton, furnace, for small and medium-sized tonnages. The United States Navy opens bids June 24 on about 120 tons of No. 1X and No. 2 foundry iron for the Philadelphia, Brooklyn and Portsmouth, N. H., navy yards. Furnace operations have receded further following blowing out by the Bethlehem Steel Co. at the end of May of the only furnace in blast at Coatesville, Pa. The Virginia furnace interest has closed a contract with a Virginia cast iron pipe maker for about 13,000 tons of foundry iron.

### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.76 to \$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X, 2.06 to 2.76 sil.	20.76 to 21.26
Basic (del'd east. Pa.)	18.75 to 19.00
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

**Steel Bars.**—Buying has improved slightly in the past week, but orders are still small and the price is unchanged at 1.75c. a lb., Pittsburgh, or 2.04c., delivered Philadelphia.

**Reinforcing Bars.**—Bids were opened today on the school administration building for Philadelphia, requiring about 1200 tons of reinforcing bars. Prices of billet steel bars are unchanged at 1.80c. to 1.85c. a lb., Pittsburgh, or 2.09c. to 2.14c., delivered Philadelphia, with the extra for cutting to length usually omitted. Rail steel bars are quoted at 1.65c. to 1.70c., Franklin, Pa., or 1.94c. to 1.99c.,

delivered Philadelphia, with no extra for cutting to length or bending.

**Shapes.**—Mills have booked fair business in the past week, despite the holiday, but operating rates are still less than 60 per cent. Quotations are unchanged at 1.75c. to 1.80c., f.o.b. nearest mill to consumer, or 1.81c. to 1.86c., Philadelphia. On desirable business these prices are subject to slight concessions. Fabricating shops are in need of contracts and are keenly competing for new projects. One of the larger inquiries in this district is for a pier at Port Richmond for the Reading Railroad, requiring about 1500 tons of shapes.

**Plates.**—Car and tank builders are not especially active at present, but there is some inquiry for locomotives, including 10 Hudson type and 10 switching engines for the Canadian Pacific Railroad. Shipbuilding promises the largest plate tonnage, and some of this business is beginning to be placed. Mills are interested in the proposed battledeck flooring on a Hudson River pier for the Erie Railroad, but insist that the extra \$7 a ton for stretcher leveling the plates and for reshearing for welding covers only the cost. Plate prices are somewhat lacking in firmness, but small

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ½-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ¼-in. incl.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'd sheets (No. 13)	3.40c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

\*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.  
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

business is going at 1.80c. a lb., Coatesville, Pa., or 1.90½c., Philadelphia, with slight concessions on larger orders.

**Sheets.**—Local consumers are still operating at low rates, but radio manufacturers are planning to enter into their production program for this year about July 1. Blue annealed sheets, No. 13 gage, are quoted at 2.15c., Pittsburgh, or 2.44c., delivered Philadelphia, with concessions of \$1 a ton and more granted on desirable business. Automobile manufacturers and other preferred buyers are usually quoted 2c., Pittsburgh, or 2.29c., Philadelphia. Blue annealed plates, No. 10 gage, are quoted at 2c., Pittsburgh, or 2.29c., Philadelphia, with quotations to car builders and other preferred buyers 1.80c., Pittsburgh, or 2.09c., Philadelphia. Black sheets are fairly firm at 2.55c., Pittsburgh, or 2.84c., Philadelphia, and galvanized sheets are 3.20c., Pittsburgh, or 3.49c., delivered Philadelphia.

**Imports.**—In the week ended May 31, ore arrivals at this port consisted of 7550 tons of iron ore from Algeria and 1220 tons of chrome ore from Greece. Steel imports were 49 tons of structural shapes and 30 tons of steel bars from Belgium.

**Old Material.**—Consumer buying of scrap is limited to small lots, with prices showing a continued tendency to decline. While the latest sales of No. 1 heavy melting steel were at \$13 a ton, delivered, buyers show no particular interest in further buying at this price.

### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00 to \$13.50
No. 2 heavy melting steel	11.00 to 11.50
Heavy melting steel (yard)	10.25 to 10.75
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	9.50 to 10.00
Hydraulic compressed, new	12.00 to 12.50
Hydraulic compressed, old	10.00
Machine shop turnings (for steel works)	9.50
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	10.00
Heavy breakable cast (for steel works)	12.50 to 13.00
Railroad grate bars	10.50
Stove plate (for steel works)	10.50
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
No. 1 blast f'nace scrap	8.50 to 9.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	14.50 to 15.00
No. 1 cast	14.00 to 14.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	15.00 to 15.50

# CLEVELAND

## Seasonal Decline in Steel Business Appearing —Plant Operations Curtailed

**CLEVELAND, June 3.**—Evidences are appearing of the usual seasonal decline in the demand for steel. However, the summer slump is expected to be less conspicuous than in most years because of the light demand during recent months. Orders for finished steel fell off the past week, but this is at least partly accounted for by the holiday. With the summer months now ahead, the market is expected to drift along without prospects of improvement before the middle of September.

Steel plant operations in Cleveland were curtailed this week by the shutting down of three open-hearth furnaces. Local plants are now operating at 70 per cent of ingot capacity, as compared with 79 per cent a week ago.

Reports from Detroit indicate that the peak of automobile production has been passed and that there will be a moderate slowing down this month.

The Chevrolet company is reported to have made a reduction in schedules for June, and buying of steel by the Ford Motor Co. has been reduced, although the latter company apparently is still maintaining its recent production. Some of the other automobile manufacturers are not holding to their recent schedules. New models to be brought out during the summer probably will stimulate activity somewhat. The Buick Motor Co. so far has placed steel quite sparingly for its new line of cars.

Some plants in industries outside of the automotive field are not maintaining their recent rates of operation.

No price changes were made during the week and quotations are being quite well maintained at the recent levels, although there is considerable pressure from the automotive industry for further concessions. Consumers are showing no interest in third quarter contracts and mills evidently are giving little consideration to the coming quarter.

**Semi-Finished Steel.**—Specifications are not holding up to recent volume, and the leading local producer shut down two open-hearth furnaces during the week, now operating eight of 14.

**Pig Iron.**—Some consumers are beginning to show an interest in third quarter contracts and a few sales were made for that delivery during the week. There was also a slight gain in spot shipment orders. One producer sold 8000 tons the past week. A 50c. a ton reduction on foundry and malleable iron has been made in eastern Michigan, \$19 now being the quoted price in the eastern as well as in the western part of the State. Prices have also eased in northern Indiana, where there is now a range of \$18 to \$18.50. For Cleveland delivery, the price is unchanged at \$18.50, furnace. While \$18 is the usual asking price for outside shipment, this probably can be shaded for delivery to competitive points.

Pending inquiries include one from northern Indiana for 1000 tons of malleable iron for June and July shipment and one from southern Ohio for

1000 tons of foundry iron for the third quarter. One producer reports a gain of 10 per cent in shipments in May over April. Other furnaces shipped slightly more iron last month than during the previous month.

### Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable .....	18.50
Ohio silvery, 8 per cent....	28.00
Basic Valley furnace....	18.50
Stand. low phos., Valley....	\$26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

**Sheets.**—Demand from the automotive industry shows a slight declining tendency and business from other consumers continues light. Stocks are low and consumers are ordering in small lots. There is no apparent change in the price situation, mills not showing a disposition to go below present ruling quotations. While an occasional concession of \$1 a ton is reported on black sheets, these are being generally maintained at 2.55c., Pittsburgh. Curtailment in the automotive industry has resulted in the holding up of some shipments of auto body sheets.

**Wire Products.**—Prices are generally well maintained, although concessions of around \$2 a ton are reported on an attractive lot of cement-coated nails carrying good extras. Demand for wire is inactive. The price is firm at 2.30c. a lb.

**Bars, Plates and Shapes.**—Demand for these products fell off the past week. Mills are getting a fair number of orders for steel bars, but they are for small lots. Structural awards and inquiries have declined, although a fair amount of work is pending. On plates and shapes, the 1.75c., Pittsburgh, price has virtually disappeared except for small lots, car lot business generally going at 1.70c. Steel bars are holding to 1.80c., Cleveland, for local delivery, but for outside shipment 1.75c., Cleveland, is being done, although some outside mills are adhering to 1.75c., Pittsburgh.

**Bolts and Nuts.**—Demand for bolts and nuts continues slow. The volume of business during May was slightly below that of April. The market is

firm at the recent reduction to 73 per cent discount. Manufacturers state that they are absorbing one-half of the price reduction, the remainder being covered by the lower cost of raw material. The industry is operating at only about 50 per cent of capacity.

**Warehouse Business.**—A reduction of 25c. a 100 lb. in base prices on cold-finished steel has been announced by Cleveland jobbers, effective June 2. Round and hexagon bars are now quoted at 3.40c., base, and flat and square bars at 3.90c., base.

**Strip Steel.**—Hot-rolled strip is in fair demand from Detroit, but orders are scarce in this territory. Prices are well maintained at 1.70c. Pittsburgh, for wide strip and 1.80c. for narrow. Demand for cold-rolled strip continues very dull. Prices are unchanged at 2.45c. to 2.55c., Cleveland, some of the mills holding to the higher price for less than car lots.

**Iron Ore.**—Water shipments of Lake Superior ore during May amounted to 6,979,212 tons, as compared with 9,549,273 tons during the same month last year. The total movement until June 1 was 7,087,132 tons, as against 12,065,514 tons during the corresponding period of 1929, or a loss of 4,978,382 tons.

**Old Material.**—Heavy melting steel has again been marked down 50c. a ton, this being the second 50c. a ton reduction in two weeks. A Cleveland mill, which has been taking by water shipments of steel-making scrap carried over on 1929 contracts, has made another purchase of heavy melting steel scrap in Detroit for water shipment, and this competition of boat scrap, as well as a large supply and limited demand, have been factors in further depressing the market.

### Prices per gross ton delivered consumers' yards:

<b>Basic Open-Hearth Grades:</b>	
No. 1 heavy melting steel...	\$12.00 to \$12.50
No. 2 heavy melting steel...	11.75 to 12.00
Compressed sheet steel....	12.50 to 12.75
Light bundled sheet stampings .....	11.00 to 11.50
Drop forge flashings.....	10.50 to 11.00
Machine shop turnings....	8.50 to 9.00
Short shoveling turnings...	10.00 to 10.50
No. 1 railroad wrought...	13.00 to 13.50
No. 2 railroad wrought...	14.00 to 14.50
No. 1 busheling.....	12.00 to 12.50
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
<b>Acid Open-Hearth Grades:</b>	
Low phos., forging crops..	17.75 to 18.00
Low phos., billet bloom and slab crops.....	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap....	18.00 to 18.50
<b>Blast Furnace Grades:</b>	
Cast iron borings .....	9.50 to 9.75
Mixed borings and short turnings .....	9.50 to 9.75
No. 2 busheling.....	8.75 to 9.00
<b>Cupola Grades:</b>	
No. 1 cast.....	15.00 to 15.50
Railroad grate bars.....	11.00 to 12.00
Stove plate .....	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.50
Rails for rolling.....	16.25 to 16.50
Railroad malleable .....	16.00 to 16.50
<b>Miscellaneous:</b>	

## PACIFIC COAST

**SAN FRANCISCO, May 31 (By Air Mail)**—Movement of steel products the past week was confined, with few exceptions, to lots of less than 100 tons. Some improvement in demand for cast iron pipe is noticeable. The price structure continues on a fairly firm basis.

Awards of reinforcing steel bars totaled less than 400 tons. Los Angeles placed 124 tons with the Los Angeles Iron & Steel Co., and the Northwest Steel Rolling Mills took 124 tons for a steam generating plant at Tacoma, Wash. Included among new inquiries are 415 tons for the Washington Street bridge, Los Angeles, bids on which will be opened June 25, and 170 tons for highway work in Tehama County, Cal. Bids were opened this week on 350 tons for a bridge over the Salinas River, Monterey County, Cal. San Francisco district prices on bars out-of-stock remain unchanged at 2.30c., base, on carload lots. Los Angeles quotations are \$2 a ton higher.

One of the largest plate inquiries that has come up for figures during the past few months involves 2027 tons for the Bully Creek and Fairman Coulee siphons at Vale, Ore. The price remains firm at 2.25c., c.i.f.

A fair volume of structural awards, in lots of less than 100 tons, was placed. Bids have been opened on 1800 tons for the Meir & Frank store, Portland. All bids on 114 tons for two steel towers across the Duwamish

## Steel Orders Mostly Small—2027 Tons of Plates Required

### Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes...	2.45c. to 2.95c.
Soft steel bars.....	2.40c. to 2.95c.
Black sheets (No. 24).....	3.65c. to 4.30c.
Blue ann'd sheets (No. 10).....	3.05c. to 3.55c.
Galv. sheets (No. 24).....	4.30c. to 4.80c.
Struc. rivets, 1/2-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c'd nails, 100 lb. keg.....	3.40

Waterway, Seattle, were rejected. Bids will be called for shortly for upward of 2000 tons for the new Ford plant at Richmond, Cal. Shapes are firm at 2.35c. c.i.f.

**Pig Iron.**—Sales and inquiries for foundry iron involve small lots for immediate shipment. No change in quotations has occurred recently.

### Prices per gross ton at San Francisco:

*Utah basic .....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25 .....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25 .....	25.00 to 26.00

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

**Cast Iron Pipe.**—The Pacific States Cast Iron Pipe Co. secured 400 tons of 2 to 12-in. Class B pipe for Shoshone, Idaho. Fullerton, Cal., will open bids on June 3 for 110 tons and on June 17 for 831 tons. Bids will be opened June 9 on 350 tons of pipe for Santa Ana, Cal. Other new inquiries include 657 tons for Los Angeles, bids on which will be opened June 23, and 384 tons for San Diego, Cal., bids to be opened on June 9.

## BOSTON

### Pig Iron Buying in Small Total Tonnage—Scrap Market Almost at Standstill

**BOSTON, June 3.**—Business in pig iron continues quiet, sales the past week falling short of 2000 tons. They included some Indian iron at \$20.50 a ton, on dock here, duty paid, for No. 2X. Buffalo No. 2X iron is being offered at \$16 a ton. Such offers come at a time when some furnaces in that district are endeavoring to secure a little more money for their iron. A Connecticut foundry is negotiating for 500 tons of No. 2X. Otherwise, there is little business in sight.

### Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25...	\$20.28 to \$21.28
†Buffalo, sil. 2.25 to 2.75...	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25...	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75...	21.41 to 22.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

\*All rail rate.

†Rail and water rate.

**Cast Iron Pipe.**—Although pipe foundries openly quote 6-in. and

larger sizes at \$36 to \$37 a ton, foundry, prices are being cut on all attractive tonnages. The Warren Foundry & Pipe Co. has been awarded 2500 tons of 12, 16, 24 and 60-in. pipe and 185 tons of fittings by Massachusetts. The company bid \$41.20 a ton, delivered, on the pipe, or \$35.70 a ton, foundry. The United States Pipe & Foundry Co. bid \$41.75 a ton, and R. D. Wood & Co. \$42. The National Cast Iron Pipe & Foundry Co. has been awarded 190 tons of 12 to 16-in. pipe by Salem, Mass.; United States Pipe & Foundry Co. 170 tons by Malden, Mass., and R. D. Wood & Co., 110 tons by Lowell, Mass. Fitchburg, Mass., closed bids May 26 on 250 tons of 6 and 12-in. pipe but has made no award, and Nashua, N. H., is in the market for 100 tons of 6 to 12-in. Providence, R. I., closes bids today on 1500 pieces of 12-in. pipe. Two or three New England gas companies have privately placed their last half requirements, the total tonnage approximating 3000 tons. Indications now are that third quarter pipe buying will be of fairly large proportions.

**Coke.**—The three New England by-

product foundry coke makers have opened their books for last half contracts. The New England Coal & Coke Co. and the Providence Gas Co., as heretofore, are taking contracts on a sliding scale price basis. Foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone, the price in effect for considerably more than a year.

**Old Material.**—With the Bethlehem Steel Co. holding up shipments of old material and Worcester, Mass., and Pittsburgh district consumers not in the market, business is practically at a standstill. Prices during the past week established new low levels for this movement and in a majority of cases are now down to a basis where dealers cannot afford to handle material. Steel turnings and steel mill cast iron borings are within a few cents of \$4 a ton, on cars shipping point. Textile and No. 1 machinery cast are cheaper than they have been in years, but that fact so far has failed to stimulate New England foundries to buy such materials.

### Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$8.10 to \$8.75
Scrap T rails.....	8.10 to 8.75
Scrap girder rails.....	7.10 to 7.75
No. 1 railroad wrought...	9.00 to 9.50
Machine shop turnings....	4.10 to 4.60
Cast iron borings (steel works and rolling mill)	4.10 to 4.60
Bundled skeleton, long....	6.50 to 7.00
Forge flashings .....	7.00 to 7.50
Blast furnace borings and turnings .....	4.00 to 4.35
Forge scrap .....	7.00 to 7.50
Shafting .....	12.50 to 13.00
Steel car axles.....	15.50 to 16.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling .....	9.00 to 9.50
Cast iron borings, chemical	9.00 to 9.50
Prices per gross ton deliv'd consumers' yards:	
Textile cast .....	\$11.00 to \$12.50
No. 1 machinery cast....	14.00 to 14.50
No. 2 machinery cast....	12.50 to 13.00
Stove plate .....	10.00 to 10.50
Railroad malleable .....	15.00 to 15.50

**Reinforcing Bars.**—Business in reinforcing bars the past week was confined to small tonnages. Indications

### Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates .....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees .....	3.365c.
Zees .....	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled .....	4.15c.
Reinforcing bars .....	3.265c. to 3.54c.
Iron bars—	
Refined .....	3.265c.
Best refined .....	4.60c.
Norway rounds .....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth .....	5.00c. to 10.00c.
Crucible .....	12.00c.
Tie steel .....	4.50c. to 4.75c.
Bands .....	4.015c. to 5.00c.
Hoop steel .....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

### Per Cent Off List

Machine bolts .....	50 and 5
Carriage bolts .....	50 and 5
Lag screws .....	50 and 5
Hot-pressed nuts .....	50 and 5
Cold-punched nuts .....	50 and 5
Stove bolts .....	70 and 10

\*Including quantity differentials.

are that orders to be placed this week will total about 1000 tons. Billet steel bars are: One to 5-ton lots, 3.06½c. a lb., base, from stock; 5 to

99 tons, 2.56½c., and 100 tons and larger lots, 2.46½c. Rail steel bars are 2.26½c. a lb., base, f.o.b. common Boston freight rate points.

ducers' yards. Less foundry coke is being moved than a year ago. Prices continue at \$5 a net ton, Birmingham.

## BIRMINGHAM

### Pig Iron Shipments Decline—Steel Operations Unchanged

**B**IRMINGHAM, June 3.—Shipments showed a tendency to ease up last week, the aggregate movement being below production in one or two instances. The decline registered in both district and outside territory shipments. Most of those who covered have unused portions of their contracts sufficient for June and longer, and fill-in tonnages are rare. Melters have shown only the slightest interest in third quarter iron, and indications are that the present quiet market will continue until books are opened for the new quarter. The base price of \$14 holds for the iron to be delivered in the district this month.

Active furnaces have totaled 17 for several weeks. The No. 2 Woodward furnace of the Woodward Iron Co. has been changed from foundry to basic iron. At present eight of the 17 active furnaces are on foundry iron, seven on basic iron, one on recarburizing iron and one on ferromanganese.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*  
No. 2 fdy., 1.75 to 2.25 sil.....\$14.00  
No. 1 fdy., 2.25 to 2.75 sil..... 14.50  
Basic ..... 14.00

**Finished Steel.**—Mill operations continue at about the same level, though order books are generally lighter. Plate demand has declined with the lighter operations at car shops. Structural shape buying is lighter, though the immediate outlook has improved. Structural steel fabricators report more tonnage up for figures than two weeks ago. Could all work in prospect be closed fabricators say it would afford from two to three months steady running. Rail releases have been good, and order books are still sufficient for several weeks steady operations. Demand for reinforcing bars is slow as compared with three weeks ago, or a year ago. Though quotations are unchanged, prices of bars, plates and shapes are easy. Active open-hearths average 18, the same as for last week.

**Cast Iron Pipe.**—Scattering small-tonnage projects contributed about the same aggregate last week as in the preceding week, the market being without important developments. The United States Pipe & Foundry Co. booked an order from Livingston, Ala., for 8572 ft. of 6 and 8-in. pipe.

Bids were opened on projects of similar size at Shreveport, La., and Goodman, Miss. Estimates are being prepared on additional tonnages to be taken by subsidiaries of the Southern Natural Gas Corporation for constructing distributing systems in Alabama and Mississippi. Gulfport will

open bids June 12 on 11,470 ft. of 6-in. pipe and bids will be opened June 3 on a small project at Sledge, Miss.

A slight reduction in plant operations has been made by one pressure pipe maker. Operations as a whole are around 60 per cent of capacity. Good shipments throughout May kept yard stocks low. Prices are steady and unchanged at \$37 to \$38 a ton, Birmingham.

**Coke.**—While the number of active ovens is the same as for several weeks past, slow coking operations are reported in some instances and stocks are being increased at nearly all pro-

## CINCINNATI

### Pig Iron Orders for Immediate Shipment—Sheet Demand Gains Slightly

**C**INCINNATI, June 3.—Owing to the entry of two large consumers into the market to cover their third quarter requirements, the May total of business in pig iron exceeded the April volume by a small margin. Last week, probably because of the holiday, demand for pig iron declined sharply. District furnace representatives report total sales of about 2150 tons, all of which was for immediate shipment. The foundry demand continues slow, and district foundries are holding the melt to about 50 per cent of normal. Southern iron continues to be sluggish, with little or no business at the present quotations of \$13, base Birmingham. Two Dayton, Ohio, consumers are in the market for 1000 tons and 150 tons respectively of Northern foundry iron. An Indiana consumer is inquiring for 100 tons.

*Prices per gross ton, deliv'd Cincinnati:*  
So. Ohio fdy., sil. 1.75 to 2.25 .....\$20.89 to \$21.39  
Ala. fdy., sil. 1.75 to 2.25... 16.69 to 17.69  
Ala. fdy., sil. 2.25 to 2.75... 17.19 to 18.19  
Tenn. fdy., sil. 1.75 to 2.25. 17.19 to 17.69  
S'th'n Ohio silvery, 8 per cent ..... 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Finished Steel.**—The sheet demand last week, despite the holiday, was a trifle better than in the preceding week. New business was equal to about 60 to 65 per cent of capacity output. Rolling schedules, however, are being held to 55 per cent of capacity this week.

**Old Material.**—Despite a slowness of demand and curtailment of shipments by district mills, dealers' quota-

tions on scrap continue steady, a reduction of 50c. on rails for melting and short rails being the only changes.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*  
Heavy melting steel.....\$11.00 to \$11.50  
Scrap rails for melting... 11.75 to 12.25  
Loose sheet clippings.... 8.00 to 8.50  
Bundled sheets..... 10.00 to 10.50  
Cast iron borings..... 8.00 to 8.50  
Machine shop turnings... 7.50 to 8.00  
No. 1 bushelling..... 9.50 to 10.00  
No. 2 bushelling..... 6.00 to 6.50  
Rails for rolling..... 13.00 to 13.50  
No. 1 locomotive tires... 13.50 to 14.00  
No. 2 railroad wrought... 11.00 to 11.50  
Short rails ..... 17.00 to 17.50  
Cast iron carwheels..... 12.00 to 12.50  
No. 1 machinery cast.... 17.50 to 18.00  
No. 1 railroad cast..... 14.50 to 15.00  
Burnt cast ..... 8.25 to 8.75  
Stove plate ..... 8.25 to 8.75  
Brake shoes ..... 8.25 to 8.75  
Agricultural malleable... 14.00 to 14.50  
Railroad malleable ..... 15.00 to 15.50

### Warehouse Prices, f.o.b. Cincinnati

Base per Lb.  
Plates and struc. shapes..... 3.40c.  
Bars, soft steel or iron..... 3.30c.  
New billet reforc. bars..... 3.30c.  
Rail steel reforc. bars..... 3.15c.  
Hoops ..... 4.05c.  
Bands ..... 3.50c.  
Cold-fin. rounds and hex..... 3.80c.  
Squares ..... 4.30c.  
Black sheets (No. 24)..... 4.05c.  
Galvanized sheets (No. 24)..... 4.90c.  
Blue ann'd sheets (No. 10)..... 3.45c.  
Structural rivets ..... 4.20c.  
Small rivets ..... 60 per cent off list  
No. 9 ann'd wire, per 100 lb..... \$3.00  
Com. wire nails, base per keg (25 kegs or more)..... 2.95  
Cement c't'd nails, base 100 lb. keg 2.95  
Chain, per 100 lb..... 10.25  
Net per 100 Ft.  
Lap-welded steel boiler tubes, 2-in. \$16.50  
4-in. .... 34.50  
Seamless steel boiler tubes, 2-in. 17.50  
4-in. .... 36.00

# ST. LOUIS

## Pig Iron Buying Very Light—Steel Price Situation Still Weak—Scrap Lower

ST. LOUIS, June 3.—Because of the observance of Memorial Day, and, in many instances, of Saturday also as a holiday, the past week was unusually quiet. The St. Louis Gas & Coke Corporation sold only about 900 tons, including 500 tons to an Iowa melter. Shipments of the local maker for May were slightly less than for April and for May last year, but fully up to those of May, 1928. Melters show no inclination to come into the market for third quarter requirements. The stove interests, for instance, are awaiting the sale of their manufactured goods before investing further in raw materials. The implement interests are experiencing the usual seasonal let-up. Business with the steel mills in the district is quiet.

### Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$19.00
Malleable, f.o.b. Granite City	19.00
N'th'n No. 2 fdy., deliv'd St. Louis	\$20.66 to 21.66
Southern No. 2 fdy., deliv'd	17.42
Northern malleable, deliv'd	20.66 to 21.66
Northern basic, deliv'd	21.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

**Finished Steel.**—Business of the Granite City Steel Co. showed the same general improvement during the last week as during the preceding period, and the volume received in May compared favorably with that of April. Prices are none too steady, however. Concessions of \$2 a ton on blue annealed sheets and blue annealed light plates have been made.

**Old Material.**—With no buying from the mills in the district, and none in immediate prospect, the market for old material has shown further weakness. No. 1 heavy melting or shoveling steel is down 25c. a ton, as are steel angle bars and cast iron car wheels, while bundled sheets, heavy turnings, No. 1 railroad wrought and steel rails less than 3 ft. are off 50c., and railroad malleable is down \$1. Dealers are buying only to fill orders, and items offered by local railroads are being sold outside of this market,

### Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fn. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	4.35c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

the Missouri Pacific list of 4500 tons going to Kansas City and Colorado. Other railroad lists follow: Pennsylvania, 48,630 tons; Baltimore & Ohio, 17,700 tons; New York, Chicago & St. Louis, 43 carloads; Chicago, Milwaukee, St. Paul & Pacific, 23 carloads, and Nashville, Chattanooga & St. Louis, 17 carloads.

### Dealers' buying prices per gross ton, f.o.b.

St. Louis district:	
Selected heavy melting steel	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel	10.75 to 11.25
No. 2 heavy melting or shoveling steel	10.00 to 10.50
No. 1 locomotive tires	13.50 to 14.00

# BUFFALO

## Projected Bridges Over Niagara River Will Take Large Steel Tonnage

BUFFALO, June 3.—Total sales of pig iron in this territory in the past week have not exceeded 3000 tons. Stocks of iron in foundry yards are known to be very low, and producers expect that the slightest improvement in conditions will result in a buying movement. Shipments during May were slightly better than in April, but this was due to the movement by barge rather than to any increase in business. The local base price is still firm at \$18.50, with \$16 to \$16.50 being quoted on Eastern shipments. Eleven stacks are in blast in the district.

### Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

**Finished Steel.**—The Lackawanna plant of the Bethlehem Steel Co. has increased its active open-hearths to 22. About 70 per cent of the mills are on double turn and 30 per cent on single turn. The Donner Steel has reduced its open-hearth operation from four to three furnaces. The Wickwire-Spencer Steel Corporation is operating two open-hearths.

A State highway bridge at Irving, N. Y., involving 975 tons of structural steel, has been placed, and two bridges are being planned to span the Niagara River from the mainland to Grand Island. It is expected that these bridges, which will be partially structural and partially reinforcing bar construction, will run 8000 to 10,000 tons of structural steel and approximately the same amount of reinforcing bars.

**Old Material.**—The only interesting development has been the purchase by the largest consumer in the district of a tonnage of No. 1 heavy melting steel and No. 2 heavy melting steel at \$13.25 and \$11.75 respectively. It is understood that another consumer purchased a tonnage of No. 2 heavy melting steel for barge delivery at less than \$11.75. The market is con-

Misc. stand-sec. rails including frogs, switches and guards, cut apart	11.50 to 12.00
Railroad springs	13.75 to 14.25
Bundled sheets	7.50 to 8.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	11.00 to 11.50
Rails for rolling	12.50 to 13.00
Machine shop turnings	6.00 to 6.50
Heavy turnings	8.50 to 9.00
Steel car axles	15.50 to 16.00
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	16.00 to 16.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	13.50 to 14.00
Steel angle bars	10.25 to 10.75
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	12.75 to 13.25
Railroad malleable	12.25 to 12.75
No. 1 railroad cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	12.00 to 12.50

### Warehouse Prices, f.o.b. Buffalo

#### Base per Lb.

Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fn. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.20
Black wire, base per 100 lb.	3.50

siderably softer, with most of the prices quoted this week strictly nominal.

### Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$13.00 to \$14.00
No. 2 heavy melting scrap	11.25 to 11.75
Scrap rails	14.00
Hydraul. comp. sheets	11.50 to 12.00
Hand bundled sheets	10.00 to 10.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	11.75 to 12.75
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	16.00 to 16.50
Coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.00
Blast Furnace Grades:	
Short mixed borings and turnings	9.75 to 10.25
Cast iron borings	9.75 to 10.25
No. 2 busheling	7.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	19.50 to 20.00
Cupola Grades:	
No. 1 machinery cast	10.50 to 11.00
Stove plate	11.00 to 11.50
Locomotive grate bars	10.00 to 10.50
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	15.50 to 16.00
Railroad	15.50 to 16.00
Agricultural	15.50 to 16.00
Special Grades:	
Chemical borings	11.50 to 12.00

The Pittsburgh Metallurgical Co., Niagara Falls, N. Y., is constructing two furnaces which are expected to double the capacity of the plant. This company produces several types of ferroalloys.

## YOUNGSTOWN

YOUNGSTOWN, June 2.—The Carnegie Steel Co. has blown in the fourth blast furnace in its group of six stacks at the Ohio Works, Youngstown, increasing the number of active blast furnaces in the Mahoning Valley to 19 of 34, representing 62 per cent of the rated capacity. Carnegie is now operating seven blast furnaces in the Youngstown district, including two at New Castle, Pa., and one at Farrell, Pa., in addition to the four at Youngstown. The Youngstown Sheet & Tube Co. is operating four furnaces, two at Campbell and one each at Brier Hill and Hubbard plants; the Republic Steel Corporation has four stacks in blast, three at Youngstown and one at Warren; while the Sharon Steel Hoop Co., Shenango Furnace Co., United Iron Co. and the Struthers Furnace Co. are each operating one furnace.

Steel pipe departments of Valley producers are averaging 65 per cent, with an upturn in prospect, owing to

## Steel Operations of 65 Per Cent Probable for This Month

the receipt of important pipe awards. The Republic company has received an order for 9240 tons of 10-in. pipe. The Sheet & Tube company has placed a contract with a Cleveland maker for equipment which will produce steel tubing up to 24 in. in diameter by an electric welding process. This process is the development of Sheet & Tube's own engineering department.

Sheet mills in the Valley are producing about half their rated capacity this week, with 64 units of 120 in the Valley scheduled, and some of these for only part of the week. Only 28 of the 51 independent open-hearth furnaces in this territory are operating.

Sheet & Tube, Carnegie Steel, Republic and Newton Steel are averaging 65 per cent, while the Sharon Steel Hoop Co. is operating at 75 per cent. The outlook for June is for maintenance of an average production rate of 65 per cent.

the International Tube Cartel, provided the German Tube Cartel is extended for another five-year period. Extension of the German cartel is expected at the June meeting and formal renewal of the international cartel will probably be made in August or September.

## German Unemployed Total 2,791,000

DÜSSELDORF, GERMANY, May 18.—The total unemployed in Germany at the end of April was 2,791,000, about 1,000,000 more than at the end of April, 1929, and 1,500,000 more than in April, 1928. It is estimated that, with their families, this total of unemployed represents about 9 per cent of the total population of Germany.

## British and German Export Sheet Prices Equal

HAMBURG, GERMANY, May 19.—For the first time in some years the British and German prices on light gage black sheets for Japan are at the same level, which has given rise to a report that an agreement has been reached between the mills in the two countries. While the German makers are in a cartel, British producers have no association, so that such an agreement, if made, must have been between the German cartel and leading British sheet mills. The current price quoted by German and British sellers is now £12 5s. (\$59.60) a ton, f.o.b. United Kingdom or Continental port, for large lots, and £12 7s. (\$60.09) a ton, f.o.b. for small quantities.

## Belgian Copper Producer Buys Into German Mill

HAMBURG, GERMANY, May 19.—The Union Miniere de Haute Katanga in the Belgian Congo has acquired 20 per cent of the capital stock of the largest German copper and brass products producer, the Hirsch Kupfer A. G. This is generally believed to be a preliminary to withdrawal from the International Copper Cartel by the Belgian company, as the German corporation is not a member and under the new arrangement has contracted to buy all copper from the Union Miniere de Haute Katanga.

## Otis Steel to Double Its Electric Steel Capacity

An increase in the electric steel casting capacity to 400 tons a day, or double its present capacity, is planned by the Otis Steel Co. at its Lakeside Works, Cleveland. New equipment will include welding and grinding machines and a small annealing furnace. Three 500-hp. boilers will also be installed. The company recently added an electric melting furnace for the production of alloy steel castings.

## Canada

### Pig Iron Business Is Still Slow

TORONTO, June 3.—While the Canadian merchant pig iron markets made some recovery from the slowness of the previous week, new business is still restricted. Some inquiry is coming out for third quarter delivery, but so far no actual booking has been done. Current demand holds mostly to spot requirements, with small lots predominating.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable.....	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable.....	24.00
Basic.....	22.50
Imported Iron, Montreal Warehouse	
Summerlee.....	\$23.50
Carron.....	33.00

Old Material.—The market still lacks a definite trend. Mills are buying sparingly, with no large tonnage or forward delivery contracts involved. Foundry interests are responsible for most of the new business.

Dealers' buying prices:

Per Gross Ton	
Toronto Montreal	
Heavy melting steel.....	\$9.00 \$8.00
Rails, scrap.....	11.00 9.00
No. 1 wrought.....	9.00 11.00
Machine shop turnings.....	7.00 6.00
Boiler plate.....	7.00 6.50
Heavy axle turnings.....	7.50 6.50
Cast borings.....	6.50 5.00
Steel borings.....	6.50 6.00
Wrought pipe.....	6.00 6.00
Steel axles.....	14.00 17.00
Axles, wrought iron.....	16.00 19.00
No. 1 machinery cast.....	16.00 16.00
Stove plate.....	12.00 12.00
Standard carwheels.....	14.50 14.50
Malleable.....	13.00 13.00

### Per Net Ton

No. 1 mach'ry cast.....	\$15.00	....
Stove plate.....	11.00	....
Standard carwheels.....	14.00	....
Malleable scrap.....	11.00	....

## No Strengthening in Scrap at Detroit

DETROIT, June 3.—There have been no evidences of strengthening factors in the scrap market in this district during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$11.25 to \$11.75
Borings and short turnings.....	7.25 to 7.75
Long turnings.....	6.75 to 7.25
No. 1 machinery cast.....	11.25 to 11.75
Automotive cast.....	13.50 to 14.00
Hydraul. comp. sheets.....	10.75 to 11.25
Stove plate.....	9.00 to 9.50
New No. 1 busheling.....	10.00 to 10.50
Old No. 1 busheling.....	8.75 to 9.25
Sheet clippings.....	8.25 to 8.75
Flashings.....	9.75 to 10.25

## American Tube Cartel Agreement Reported

DÜSSELDORF, GERMANY, May 19.—According to well-informed sources here, the agreement on pipe and tubes, which includes Continental, British, American and Canadian producers, does not cover all kinds of pipe. The United Kingdom and Canada have only made an agreement on welded gas pipe and the United States participation is limited to oil pipe and tubes. However, the International Tube Cartel is endeavoring to extend the terms of the agreement to include all pipe, and some measure of success appears to be expected this year. It is understood that the American producers have agreed to extension of

# Non-Ferrous Metal Markets

## Copper Quiet and Firm— Tin at New Low—Lead and Zinc Dull

NEW YORK, June 3.

**Copper.**—Following the very heavy sales the latter part of May, the market has turned exceedingly quiet. Consumers, both here and abroad, covered themselves largely for June and the major portion of their July requirements. This is brought out by the fact that total bookings during May are reliably estimated at 650,000,000 lb. Foreign sales in May were about 108,000 gross tons, which is a new record. While domestic sales are very light, foreign buyers are entering the market each day and taking fair totals. This morning 800 tons was booked, but the daily sales have fallen below 1000 tons. Both domestic and foreign consumers still have some July metal to buy. Prices are exceedingly firm at 13c., delivered in the Connecticut Valley, for electrolytic copper through July, with the quotation of Copper Exporters, Inc., at 13.30c., c.i.f. usual European ports. Lake copper is quiet but strong at 13c. to 13.12½c., delivered.

Some statements that stocks of refined metal at the end of May will show a reduction are not credited in some quarters. While sales were very large in May, shipments were not heavy enough to offset the large accumulation of metal. Also, many of the orders were for June and July shipments and those for early shipment were not sufficiently large to reduce stocks decidedly.

**Copper Averages.**—The average price of Lake copper for May based on daily quotations in THE IRON AGE, was 13.12½c., delivered, New York. The price of electrolytic copper was 12.76c., refinery, or 13.01c., delivered in the Connecticut Valley.

**Tin.**—A new low price for spot Straits tin was reported today. At 30.12½c., New York, it is the lowest quotation since April 7, 1922, when it stood at 29.87½c. The cause is the old one of too much tin. According to the New York Metal Exchange, there was an increase during May in the world's visible supply of 3176 tons, bringing the total to 39,771 tons. Also, shipments from the Straits were very large during May at 10,074 tons. The estimate for shipments in June is placed at 8500 to 9200 tons. Stocks of tin in the United States, in store and landing on May 31, were 6767 tons.

While the holidays have slackened

### THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	June 3	June 2	May 29	May 28
Lake copper, New York.....	13.12½	13.12½	13.12½	13.12½
Electrolytic copper, N. Y.*.....	12.75	12.75	12.75	12.75
Straits tin, spot, N. Y. ....	30.12½	30.62½	31.25	31.25
Zinc, East St. Louis.....	4.65	4.65	4.65	4.65
Zinc, New York.....	5.00	5.00	5.00	5.00
Lead, St. Louis.....	5.40	5.40	5.40	5.40
Lead, New York.....	5.50	5.50	5.50	5.50

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

### Rolled Products

#### List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

<b>Sheets—</b>	
High brass .....	19.75c.
Copper, hot rolled .....	22.75c.
Zinc .....	10.00c.
Lead (full sheets) .....	8.25c.

<b>Seamless Tubes—</b>	
High brass .....	24.75c.
Copper .....	25.00c.

<b>Rods—</b>	
High brass .....	18.75c.
Naval brass .....	21.50c.

<b>Wire—</b>	
Copper .....	14.87½c.
High brass .....	20.25c.
Copper in Rolls .....	21.75c.
Brass Tubing .....	27.25c.

#### Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide .....	31.30c.
Tubes, base .....	42.00c.
Rolled rods in coils .....	31.00c.

### Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

<b>Sheets—</b>	Base per Lb.
High brass .....	19.75c.
Copper, hot rolled .....	22.75c.
Copper, cold rolled, 14 oz. and heavier .....	25.00c.
Zinc .....	10.00c.
Lead, wide .....	10.05c.
<b>Seamless Tubes—</b>	
Brass .....	24.75c.
Copper .....	25.00c.
<b>Brass Rods .....</b>	18.00c.
<b>Brass Tubing .....</b>	27.25c.

### New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass .....	19.75c.
Copper, hot rolled, base sizes.....	22.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	25.00c.
<b>Seamless Tubes—</b>	
Brass .....	24.75c.
Copper .....	25.00c.
<b>Brass Rods .....</b>	18.00c.
<b>Brass Tubing .....</b>	27.25c.

### New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks .....	10.25c. to 10.75c.
Zinc sheets, open.....	11.25c. to 11.75c.

### Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig .....	34.00c. to 35.00c.
Tin, bar .....	36.00c. to 37.00c.
Copper, Lake .....	14.75c.
Copper, electrolytic .....	14.50c.
Copper, casting .....	14.25c.
Zinc, slab .....	6.25c. to 7.25c.
Lead, American pig .....	6.50c. to 7.00c.
Antimony, Asiatic .....	8.00c. to 8.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	10.25c. to 10.75c.
Alum. ingots, No. 12 alloys .....	25.00c. to 26.00c.
Babbitt metal, commercial grade .....	24.00c. to 25.00c.
Babbitt metal, high grade.....	25.00c. to 35.00c.
Solder, ½ and ¼ .....	23.75c. to 24.75c.

### Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	36.25c.
Tin, bar .....	38.25c.
Copper, Lake .....	14.00c.
Copper, electrolytic .....	14.00c.
Copper, casting .....	13.62c.
Zinc, slab .....	7.00c. to 7.25c.
Lead, American pig.....	6.25c. to 6.50c.
Lead, bar .....	8.75c.
Antimony, Asiatic .....	14.00c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	41.00c.
Solder, ½ and ¼ .....	23.75c.

### Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible .....	10.25c.	11.75c.
Copper, hvy. and wire .....	10.00c.	11.25c.
Copper, light and bottoms .....	8.75c.	10.25c.
Brass, heavy .....	5.75c.	7.25c.
Brass, light .....	4.75c.	6.00c.
Hvy. machine composition .....	8.50c.	9.50c.
No. 1 yel. brass turnings .....	5.75c.	6.75c.
No. 1 red brass or compos. turnings.....	7.75c.	8.75c.
Lead, heavy .....	4.00c.	4.62½c.
Lead, tea .....	3.00c.	3.50c.
Zinc .....	2.50c.	3.00c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

business in all metals, both consumers and dealers are entirely out of the market and sales have been exceedingly light. New low prices were recorded at London today, with spot standard quoted at £136 17s. 6d., future standard at £138 15s., and spot Straits at £138 17s. 6d. The Singapore price today was £142 7s. 6d.

**Lead.**—Conditions are changed but little. Buying is still confined to carload and small lots for nearby shipment. One large producer in the West has opened its books for July shipment, but there has been no inquiry. It is estimated that 30 to 40 per cent of June requirements must still be purchased. Prices are firm and unchanged at 5.50c., New York, as the contract quotation of the leading interest, with that in the outside market at 5.40c., St. Louis.

**Zinc.**—A little buying of prime Western zinc is reported each day, but the market is not active. Prices are a little firmer at 4.65c., East St. Louis, or 5c., New York, the metal available at concessions below these levels having been taken up. Ore prices are unchanged at \$31, Joplin. Production keeps up, having been about 9600 tons last week, which is 600 tons in excess of the previous week. Sales were 10,350 tons and shipments were about 10,400 tons,

both larger than the week before. The estimated surplus now stands at 18,433 tons.

**Antimony.**—Chinese metal is dull but steady and is quoted at 7.25c., New York, duty paid, for all positions.

**Nickel.**—Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. a lb., delivered.

#### Non-Ferrous Metals at Chicago

CHICAGO, June 3.—All prices are holding except for tin on which quotations are lower. Sales are scattered and in small volume. The old metal market is quiet.

**Prices per lb., in carload lots:** Lake copper, 13.25c.; tin, 31.35c.; lead, 5.50c.; zinc, 4.75c.; in less-than-carload lots, antimony, 8.35c. On old metals we quote copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 4.25c.; zinc, 2c.; pewter, No. 1, 17.50c.; tin-foil, 20c.; block tin, 26.50c.; aluminum, 8.50c.; all being dealers' prices for less-than-carload lots.

## Reinforcing Steel

### Awards 3800 Tons—5200 Tons Added to Pending Work

**I**NCLUDING 1750 tons for a memorial bridge, reinforcing steel awards the past week totaled 3800 tons. Other lettings were mostly in small lots. Contracts in May amounted to 43,150 tons, the most active month this year. New projects call for 5200 tons and do not include several on which the tonnage is still being estimated. Awards follow:

NEW YORK, 300 tons, foundations for Doherty-Cities Service Building, Pearl, Cedar and Pine Streets, to National Bridge Co.

STATEN ISLAND, N. Y., 100 tons, Baltimore & Ohio Railroad spur; awarded by Costello Concrete Construction Co., New York, to McClintic-Marshall Co.

TOTTENVILLE, N. Y., 150 tons, Page Avenue viaduct, to McClintic-Marshall Co.

BEAVER COUNTY, PA., 160 tons, Monaca-Rochester bridge, to Electric Welding Co.

EAST PITTSBURGH, PA., 1750 tons, George Westinghouse Memorial Bridge, to McClintic-Marshall Co.

MILWAUKEE, 600 tons, Northwestern Elevator Co., to an unnamed bidder.

RACINE, WIS., 400 tons, Court House, to Joseph T. Ryerson & Son, Inc.

LOS ANGELES, 124 tons for city, to Los Angeles Iron & Steel Co.

SACRAMENTO, 124 tons, highway work in Humboldt County, to unnamed bidder.

TACOMA, WASH., 125 tons, steam generating plant, to Northwest Steel Rolling Mills.

#### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1700 tons, pier No. 34, North River, Department of Docks, New York; general contract awarded to Allen N. Spooner & Son, Inc., New York.

DOBBS FERRY, N. Y., 410 tons, highway work, Sawmill River Parkway; general contract bids to be taken June 10.

BERGEN COUNTY, N. J., 250 tons, highway bridges, route 6, sections 1C and 2.

PHILADELPHIA, 1200 tons, administration building for Philadelphia school district; originally reported as 200 tons.

NEWPORT NEWS, VA., unstated tonnage, piers for Chesapeake & Ohio Railroad; W. Horace Williams Co., New Orleans, general contractor.

QUINCY, ILL., tonnage being estimated, Lincoln Douglas Hotel.

CHICAGO, tonnage being estimated, Borden Co.

CHICAGO, 800 tons, Lane Technical High School.

DECATUR, ILL., tonnage being estimated, seven-story starch packing house for A. E. Staley Mfg. Co.

GALESBURG, ILL., 1200 tons, sewage disposal plant; new bids opened.

MERRILL, WIS., 210 tons, Center Avenue bridge; bids close June 18.

LOS ANGELES, 415 tons, Washington Street bridge; bids June 25.

LOS ANGELES, 150 tons, office building addition, 6235 Hollywood Boulevard; bids being taken.

VALE, ORE., 124 tons, Bully Creek and Fairman Coulee siphons for Vale project; bids June 9.

SACRAMENTO, 170 tons, highway work in Tehama County; bids June 18.

## Industrial Machinery Exports Show Gain

WASHINGTON, June 3.—American exports of strictly industrial machinery as classified by the Industrial Machinery Division, Department of Commerce, for the first four months of 1930 reached a total of \$87,533,000, or about 4 per cent more than for the corresponding period of last year, according to S. R. March of that division.

Unlike the Division of Statistics, the Industrial Machinery Division excludes steam locomotives, and internal combustion engines not over 10 hp., and other units from its classification. Mr. March says this increased trade volume is especially noteworthy in view of the fact that the general export trade of the United States declined about 20 per cent during the first four months of the current year when compared with the corresponding period of last year.

## Revises Hack-Saw Blade Simplified Practice

Simplified practice recommendation No. 90, covering hack-saw blades, has been revised and is being issued in printed form.

No changes have been made in Table I, covering tungsten and carbon blades (all hard and flexible), but Table II, tungsten and carbon blades, covering power hack-saw blades (all hard) has been modified by the elimination of four sizes and the addition of five other sizes. Successful operation of the tungsten and carbon blade program in the past prompted the standing committee at the revision meeting to enlarge the scope of the recommendation to include two tables for sizes for high-speed blades.

## Railroad Equipment

Inland Steel Co. is inquiring for one or two storage oil-electric locomotives.

General American Tank Car Corporation has ordered one six-wheel switching locomotive from American Locomotive Co. This is in addition to a previous order for one locomotive.

Chilean State Railways has ordered four electric locomotives for express and passenger service from Westinghouse Electric & Mfg. Co.

United States Navy Department is inquiring for two box and two flat cars.

High Point, Thomasville & Denton is inquiring for six flat cars and two caboose cars.

Erie has ordered 10 gas-electric rail motor cars from Bethlehem Steel Co.

Canadian Pacific Railroad is in the market for 10 Hudson type and 10 switching locomotives.

Chicago offices of Robbins & Myers Sales, Inc., Fan and Motor Division, under D. B. Hutchinson, and Robbins & Myers, Inc., Hoist and Crane Division, under W. J. Scott, have been moved from 567 East Illinois Street to 919 North Michigan Avenue.

## Fabricated Structural Steel

### Awards of 23,000 Tons Are 8000 Tons Below Total of Previous Week—New Pending Work Only 16,000 Tons

**S**TRUCTURAL steel awards, at about 23,000 tons, were 8000 tons below the total of the previous week and new work that came into the market for bids totaled only 16,000 tons. To some extent, perhaps, the double holiday at the end of last week contributed to the poor showing.

The largest awards were 5000 tons for an express terminal building in Chicago for the Chicago & North Western Railroad and 2800 tons for bridges for the Chicago Great Western Railroad. The Chicago district also contributed three of the outstanding new projects—2200 tons for an approach to the Wabash Avenue bridge, 1200 tons for Illinois highway bridges and 1000 tons for a building for the Chicago Yacht Club. A Ford Motor Co. plant at Richmond, Cal., calls for 2000 tons. Awards follow:

BANGOR & AROOSTOOK RAILROAD, 500 tons, bridge, to Bethlehem Steel Co.

STATE OF NEW HAMPSHIRE, 125 tons, highway bridge, to American Bridge Co.

BURLINGTON, VT., 150 tons, theater and office building, to Porcupine Co., Bridgeport, Conn.

STAMFORD, CONN., 100 tons, addition to manufacturing building, to Porcupine Co.

NEW YORK, 1000 tons, substations 5 and 6 for Board of Transportation, to Hay Foundry & Iron Works.

NEW YORK, 300 tons, column cores for building at Albany and Cedar Streets, to an unnamed fabricator.

NEW YORK, 400 tons, school No. 13 in Queens, to Easton Structural Steel Co.

NEW YORK, 300 tons, loft building on West Forty-seventh Street, to Easton Structural Steel Co.

PLEASANTVILLE, N. Y., 250 tons, garage for Westchester Lighting Co., to American Bridge Co.

DEPEW, N. Y., 295 tons, bridge for New York Central Railroad, to Bethlehem Steel Co.

WESTCHESTER COUNTY, N. Y., 150 tons, dormitory for Lawrence College, to Guilbert Steel Co.

STATE OF NEW YORK, 500 tons, highway bridges, to American Bridge Co.

CENTRAL ISLIP, N. Y., 1000 tons, State hospital buildings, Allied Bronze & Ornamental Iron Corporation, to National Bridge Works.

PENNSYLVANIA RAILROAD, 400 tons, bridge in Pittsburgh, to McClintic-Marshall Co.

IRVING, N. Y., 975 tons, State highway bridge, to Lackawanna Steel Construction Co.

PUNKHANNOCK, PA., 320 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

PHILADELPHIA, 350 tons, building at Temple University, to Bethlehem Fabricators.

BATTLE CREEK, MICH., 1800 tons, bank building, to R. C. Mahon Co.

CUNNINGHAM, W. VA., 150 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

BALTIMORE & OHIO RAILROAD, 210 tons, bridges in Maryland, to Shoemaker Bridge Co.

ALABAMA CITY, ALA., 225 tons, soaking pits for Gulf States Steel Co., to Nashville Bridge Co.

CLEVELAND, 675 tons, warehouse for Fisher Body Corporation, to R. C. Mahon Co.

SOUTH BEND, IND., 1000 tons, Bendix Aviation Corporation, to an unnamed bidder.

INDIANAPOLIS, 1800 tons, Indianapolis Power & Light Co. building, to Hetherington & Berner Co., local.

CHICAGO, 500 tons, World's Fair administration building, to an unnamed bidder.

CHICAGO, 5000 tons, express terminal building for Chicago & North Western, to American Bridge Co.

CHICAGO GREAT WESTERN, 2800 tons, 1930 bridge program; 1700 tons to American Bridge Co., 925 tons to McClintic-Marshall Co., 175 tons to Pittsburgh-Des Moines Steel Co.

BRIDGEPORT, WIS., 1500 tons, highway bridge, to Lakeside Bridge & Steel Co.

DES MOINES, IOWA, 1000 tons, Burton Building, to Pittsburgh-Des Moines Steel Co.

#### Structural Projects Pending

Inquiries for fabricated steel work include the following:

MALDEN, MASS., 101 tons, grandstand.

BOSTON & ALBANY RAILROAD, 100 tons, bridge repairs at Brookfield, Mass.

CAMBRIDGE, MASS., 300 tons, building for Harvard University.

FORD CITY, PA., 1800 tons, building for Pittsburgh Plate Glass Co., Jones & Laughlin Steel Corporation low bidder.

READING RAILROAD, 1500 tons, pier at Port Richmond on Delaware River.

COPLEY, PA., 500 tons, bridge for Northampton County; Seeds & Durham, Inc., Philadelphia, low bidder for general contract.

WASHINGTON, unstated tonnage, three dormitories for women at Howard University.

MORGANTOWN, W. VA., 100 tons, theater and store for Warner Brothers.

BROOKLYN, 600 tons, building on Flatbush Avenue for Sheffield Farms Co.

MINEOLA, N. Y., 500 tons, parochial school.

RYE, N. Y., 400 tons, high school.

TOLEDO, OHIO, 500 tons, Toledo Scale Co.

STATE OF ILLINOIS, 1200 tons, highway bridges; bids to be opened June 11.

CHICAGO, 1000 tons, Chicago Yacht Club.

CHICAGO, 2200 tons, approach to Wabash Avenue bridge.

MERRELL, WIS., 275 tons, Center Avenue bridge; bids close June 18.

WAUSAU, WIS., 330 tons, McClary bridge; bids close June 5.

UNION PACIFIC, 300 tons, Fourteenth Street viaduct at Omaha, Neb.

VALE, ORE., 2027 tons, plates, Bully Creek and Fairman Coulee siphons for Vale project; bids June 9.

RICHMOND, CAL., 2000 tons, Ford plant; bids to be taken at once.

#### Use of Electricity About Stationary

Productive activity in the United States, measured by monthly electricity consumption in manufacturing plants, is placed by *Electrical World* at 120.2 for April, compared with 120.3 for March. The average for the first four months was 121.4,

compared with 136.2 for the same period of 1929. All figures refer to 100 as the average of 1923-1925.

Metal industries showed 130.2 for April, a drop of 2.6 per cent from the 133.7 of March. Rolling mills and steel plants reflected a gain, to 138.3, from 136.8 in March; whereas other metal-working plants, ferrous and non-ferrous, dropped to 125.5 from 132. Automobiles went up, from 108.9 to 112.9, and shipbuilding, from 117.7 to 130.1 in April.

### Railroad Expenditures Gain This Year

WASHINGTON, May 31.—Expenditures by Class I railroads during the first quarter of 1930 for new equipment totaled \$89,070,000, compared with \$37,642,000 for the corresponding period of last year, while roadway and structures expenditures were \$134,702,000, against \$89,477,000, according to the American Railway Association.

Announcing the results of a special questionnaire sent out to determine the extent to which rail carriers have cooperated with the policy of President Hoover to maintain employment and business progress, the association reported that the capital expenditures of \$223,772,000 showing in the foregoing items were \$11,772,000 above the estimate of \$212,000,000 for the first quarter submitted by the railroads at the conference of industrial leaders in Washington last December. They also were an increase of \$96,653,000 over capital expenditures made during the first quarter of 1929 and an increase of \$95,344,000 above the corresponding period in 1928.

### Discuss Allowable Limits for Sizing Abrasives

A general conference of representatives of manufacturers and users of aluminum oxide and silicon carbide abrasives for polishing uses and for grinding wheel manufacture, recently held under the auspices of the division of simplified practice of the Bureau of Standards, Department of Commerce, at Washington, unanimously approved a simplified practice recommendation for these products. The simplification program is based on a table of allowable limits for the sizing of these abrasives as proposed by the producers of electric furnace abrasives. The recommendation, subject to the recorded approval of the industry, will be effective Sept. 1, 1930.

Appointment of a standing committee of the industry, composed of three representatives each of the manufacturers and the users, was authorized by the conference. Formation of a technical committee to conduct research on screens used in grading abrasive grains was also proposed. At the suggestion of those present, two abrasive manufacturers, two screen manufacturers and two consumers will be invited to serve on this committee.

# Indian Buyers Claim Force Majeure

British Reject It as Reason for Cancellation—Cunard Line  
Places 75,000-Ton Vessel

(By Cable)

LONDON, ENGLAND, June 2.

THE Bombay Native Piece Goods Merchants' Association has informed the Manchester Chamber of Commerce that *force majeure* rules in India and that while there is no intention of violating the sanctity of contracts it will be detrimental if more goods are shipped. Therefore, the association advises that arrangements be made for cancellation or suspension of orders. The Manchester Chamber of Commerce says that it cannot accept the *force majeure* plea and expects dealers to continue to honor all contracts.

The Sheffield Chamber of Commerce in advocating safeguarding of iron and steel has informed Philip Snowden that the real danger under present unprotected conditions is that the iron and steel industry may be reduced to such impotence as to cease to be an effective force in either domestic or overseas markets.

## Imports Over Half Exports

Sir Hugh Bell at the Free Trade Conference stated that in 1929 the United Kingdom imported 2,800,000 tons of iron and steel at an average cost of £8 15s. (\$42.57) per ton and exported 4,480,000 tons at £15 10s. (\$75.42) per ton. His only remedy for present conditions was that the nation and individuals should live simpler lives.

Philip Snowden, called to account in the House of Commons for his recent

British Sellers to India Unwilling to Grant *Force Majeure* to Justify Cancellations.

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Proposed British Import Rule Would Require Marking Bolts, Nuts and Screws With Origin.

\* \* \*

World Steel Capacity Up 60 Per Cent Since 1913.

\* \* \*

Cunard Line Awards 75,000-Ton Liner to Cost \$24,330,000.

\* \* \*

German Unemployed, Based on Families, Represent Nine Per Cent of Population.

United States and on the Continent.

A draft of import regulations has been laid before Parliament, requiring that indication of the origin be shown on imported bolts, nuts, rivets, setscrews, coachscrews and studs.

## European Wages Investigated

The Prime Minister has announced that the report of the committee of inquiry on the iron and steel trades will be ready shortly. The report contains the results of an investigation into Continental wages and conditions. This part of the investigation will be made public but publication of the rest is doubtful.

The Continental Steel Cartel has agreed to include 15 British merchants in class "A," so that the market is likely to become more stabilized, as these merchants will agree not to sell at less than the cartel prices. The situation is still complicated, however, as there is no important business about.

## Five-Year Iron Contract Made

Pease & Partners have sold 175,000 tons of hematite iron for delivery to Sheffield over the next five years. Otherwise there is no change in the general condition of the pig iron market.

The Cunard Line is awarding a new liner to John Brown & Co., Ltd. The displacement is about 75,000 tons, and the cost more than £5,000,000 (\$24,330,000). Scottish mills will probably supply the steel. Steel works are badly in need of heavy material or-

statement that Baldwins, Ltd., the Ebbwvale Steel & Iron Co. and the Consett Iron & Steel Co. lacked industrial efficiency, said that he had been misled by inaccurate figures supplied to him, but justified his criticism by quoting a letter written to the press by Arthur Colegate, chairman of the board of Robert Heath & Lowmoor, Ltd., stating that many sections of the steel industry will experience no permanent improvement unless plants and methods are brought into line with the best practice in the

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

## British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.	£10 15s.	to £11 15s.	\$52.30 to \$57.17
Billets, open-hearth.....	6 0	to 6 10	29.20 to 31.63
Black sheets, Japanese specifications.....	12 5		59.61
Tin plate, per base box..	0 18½	to 0 18½	4.46 to 4.50
Steel bars, open-hearth..	8 0	to 8 10	1.74 to 1.85
Beams, open-hearth.....	7 7½	to 7 17½	1.60 to 1.71
Channels, open-hearth...	7 12½	to 8 12½	1.66 to 1.87
Angles, open-hearth.....	7 7½	to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	9 15	to 10 0	2.12 to 2.17
Galvanized sheets, No. 24 gage.....	11 17½		2.57

## Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos. ....	£3 2½s. to £3 3½s.	\$15.21 to \$15.45
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Billets, Thomas.....	4 13	to 4 14	22.63 to 22.87
Wire rods, low C., No. 5 B.W.G. ....	6 2	to 6 4	29.69 to 30.19
Rails, light.....	6 0		29.20
Black sheets, No. 31 gage, Japanese.....	11 5	to 12 12	54.68 to 58.32
Steel bars, merchant....	5 7½		Cents a Lb. 1.18
Steel bars, deformed....	5 6½	to 5 7½	1.17 to 1.18
Beams, Thomas, British standard.....	5 1	to 5 2½	1.11 to 1.14
Channels, Thomas, American sections.....	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick.....	5 6		1.17
Angles, Thomas, 3-in....	5 7½		1.18
Hoop and strip steel over 6-in. base.....	5 15		1.27
Wire, plain, No. 8 gage..	6 9		1.41
Wire, barbed, 4-pt. No. 12 B.W.G. ....	10 10		2.28
Wire nails, base.....	6 12½		\$1.44 a keg

ders and export sales are negligible, except for minor Colonial government business.

#### Russia to Double Canning Output

The Soviet Union canning industry is to be developed rapidly to satisfy the growing demand. The canned meat output of 150,000,000 cans this year is to be doubled in 1931.

Tin plate business is quiet and the market steady, consumers buying only moderately in expectation of prices declining as a result of cheaper tin. Makers, however, are well booked for many weeks and not pressing for new sales.

Galvanized sheets are quiet and Japanese specifications for black sheets are small.

Clyde shipbuilding in May was 35 vessels of 54,000 tons.

Shareholders in the Pearson & Knowles Coal & Iron Co., Ltd., Moss Hall Coal Co., Ltd., the Wigan Junction Colliery Co., Ltd., and the Parlington Steel & Iron Co. have approved the merger of interests for formation of the Wigan Coal Corporation and Lancashire Steel Corporation.

### Wage Reductions Imminent in Germany

(By Radio)

STEEL mills and blast furnaces are still curtailing output, reducing delays in delivery and discharging workers. While domestic steel prices are still unchanged, reductions will be made if the recently rendered decision of the arbitration court permitting wage reductions is applied by the mills. Steel men in Düsseldorf see no recovery of business before fall.

Producers of steel tubes are only operating at about 40 per cent of capacity, but machinery exports continue at a high level. Inactivity in the steel industry now embraces pig iron and all steel products.

While the Continental Steel Cartel has made no revision of the minimum export prices established last winter, exporters are granting concessions on products not regulated by the cartel and also on pig iron, the cartel has decided to hasten establishment of the selling and price regulating syndicates for leading steel products.

### Russia Exports Sewing Machines to Asia

HAMBURG, GERMANY, May 19.—Manufacturers of sewing machines in Germany have received reports from their agents in Persia and Afghanistan that the Soviet Union is selling such machines through its representatives in Teheran and Kabul at extremely low prices. Many sales are reported being made on credit terms of six to nine months. Although the quality of the machines is said to be poor the price is so low that large sales have not been difficult. This is interpreted in some quarters as the beginning of severe competition at low prices in other manufactured products.

## Germany Considers Lower Steel Prices

### Wage Reductions Also Urged as Means of Curtailing Imports of Steel—Export Prices Low

BERLIN, GERMANY, May 17.—Depression in the steel industry here has led to widespread discussion of the advisability of fixing prices. One group of steel producers is urging general price reductions on the condition that wages should also be lowered. It is noteworthy that certain collective wage agreements may be legally abrogated by either party at the end of June and others at the end of September. This proposal is receiving some opposition, even among the steel producers, as it is pointed out that the cost of living has not declined.

When the domestic syndicates were renewed in 1925 and 1926, domestic prices for semi-finished and finished steel products were established, which have been adhered to by all producers. Since 1926 these prices have been revised only twice, early in 1928 in con-

sequence of wage advances, and in May of the same year when coal prices were increased. Meanwhile, export prices of steel products have steadily declined until today the average price is about 30 m. (\$7.14) less than the highest price since the war.

While the tariff and high inland freight rates prevent the German market from being flooded with foreign material, importation is considerable and a reduction of the domestic price would undoubtedly curtail the tonnage of foreign steel being bought here. However, a general reduction of steel prices to lower levels is not expected, although a more elastic system of price fixing by the syndicates appears likely, evidenced by the fact that the recently established Steel Bar Syndicate has granted its members certain freedom in fixing their prices for high-quality material.

## British Steel Tariff Urged

### Capacity Has Increased Only 25 Per Cent from Pre-War Compared with 80 Per Cent Increase in United States

LONDON, ENGLAND, May 17.—According to the figures quoted recently by M. S. Birkett, secretary of the National Federation of Iron and Steel Manufacturers, in a paper to the Royal Statistical Society, world production of steel has increased by about 60 per cent since 1913, and British production only by about 25 per cent. Production in the United States has grown by about 80 per cent, and that of France, Germany, Belgium and Luxemburg, the principal producers of Continental Europe, by about 45 per cent; that of the rest of the world by about 70 per cent.

British exports have fallen by about 600,000 tons from 4,900,000 tons to 4,300,000 tons, largely through the increased production of India and Australia, while imports have increased by about the same amount from 2,200,000 to 2,800,000 tons. But the capacity of the home market has increased considerably and the amount of steel consumed domestically is actually larger than before the war, having risen from an ingot equivalent of 3,200,000 tons in 1913 to about 4,900,000 tons in 1929. In the iron section of the trade the British industry has, however, suffered much more severely, largely because of falling off in exports, which have decreased from 945,000 tons in 1913 to about 455,000 tons in 1929.

The growth of tariffs is stated by many to be the cause of decline in the iron and steel industry, and there are those who believe that the organization recently created for export and selling will not function well until safeguarding is applied to the industry.

Sir W. Peter Rylands, president of the federation, points out that the great steel-producing countries founded and still maintain their industry upon protective tariffs, and that, instead of the price of steel advancing in every case, they have been able to develop a vast export trade at prices lower than the British. He estimates the difference between full-time working and the speed at which works are going at present to be at least 10 to 15 shillings a ton, while the additional security to the industry provided by equal competitive conditions would stimulate the introduction of new capital necessary for the adoption of new and improved methods.

### American Car Company Invests in Europe

HAMBURG, GERMANY, May 19.—The General American Tank Car Corporation has acquired an interest in two European companies, the Materialleihanstalt, controlled by the Hoffman-Busch interests, and in the Allgemeine Europäische Transportmittel A. G. of Zurich, Switzerland.

### India Buys German Steel

HAMBURG, GERMANY, May 19.—The new buying policy of the Indian Government, providing for purchases through native companies, most of which are agents for Continental rather than British producers, continues to bring business to Germany. About 1000 tons of fish plates has been placed in Germany for the Indian railroads, and orders are pending for locomotives and boilers.

## 10,000 Automobile Frames a Day

(Concluded from page 1668)

peared in many new and clever applications. Almost invariably cams were employed for their drive, since intricate timing had to be followed. On most of these feeders it was sufficient to use gravity dogs, one set moving and another stationary.

One high-speed conveyor, however, had to be equipped with positive disappearing dogs, necessitating one added motion. Adjustable end-guards took care of guiding the blanks and, as on nearly every type of feeder, safety devices were provided, which automatically stop the whole unit in case anything goes wrong.

An interesting solution of a feeder problem is a double reciprocating overhead carriage operated with wire ropes, for the feeding and unloading of the offsetting press. This device picks up the steel strip with magnets and does a perfect job at very high rates of speed.

Another clever device feeds and unloads the forming presses. It has disappearing fingers which simultaneously pick up a blank from the cross conveyor underneath and a finished side-bar in the press; then rushes 20 ft., stops, and deposits the bar in a crate and the blank in its exact position on the forming die. Split seconds and perfect timing are absolutely essential here, and it is well safeguarded by sensitive electrical devices.

### Inertia Becomes an Important Factor

Feeders and such devices are, however, to be found in many plants and in connection with many machines, but entirely new problems faced the designers of the side-bar parts assembly line. Thirty-eight trucks, each one a real machine in itself, with four smaller carriages, had to be put through their paces according to a very difficult timing diagram.

Swift movements, sudden and accurate stopping and starting of such great masses, involved staggering loads, and an inertia which could not be overlooked. Enormous cams, of a size and design nowhere else to be seen, operate this machine, and powerful balancing devices are provided to absorb the suddenly released energy.

Running on rails, the trucks advance intermittently on an upper level. At each station the trucks are doweled, the smaller carriages are simultaneously thrust out, two to each side, and also doweled, thus carrying the side rails, to be worked on, into the waiting machines. These quickly perform their work; the carriages retreat and the trucks advance to the next station, where the same cycle is again repeated—each consuming a total of but 8 sec.

At the end of the line, truck after truck is unloaded and lowered on to the return tracks on the lower level, where a screw-like device propels

them back to the starting end at uniform speed. Raised again to the upper level by means of an elevator, they receive new loads and repeat the performance.

### Machines Move Up to the Work

IN the general assembly two track systems with trucks are combined into one unit. Here weights are still greater, and the assembling and nailing machine adds to make this one of the most complicated and, to the visitor, most baffling of machines. The powerful drive, with its string of enormous cams, resembles that of the preceding unit, the side-bar parts assembly line.

In one respect, however, does this unit present a new angle of conveying. Unlike the previous unit, the work is not brought up to the machine, as the right and left side-bars are no longer separable. So the frames, now assembled, stay on the trucks while the operating machines are brought to the work. This is accomplished by having the riveting machines mounted on platforms, provided on each side of each truck line. A stationary steel floor over the platforms makes it possible for the men to walk around among the individual reciprocating machines.

The procedure is, then, for the trucks to run intermittently, stopping for a length of time at each station. Here the truck with the frame on it is lifted up on dowels, the riveting machines advance from each side, carried on the platforms, and perform their work of setting the rivet heads. Very ingenious heads were invented, which enable the machines to set any rivet, no matter how it is located, with a few standard types of machine heads. After the work is done the jaws of the machines open up, the machines retreat, and the trucks then advance another step and the whole performance is repeated.

### Multitudinous Operations Daily

An average frame (for the plant produces frames for many makes and models of automobiles) is composed of some 125 parts and 552 operations are required for its production. All of these parts, manufactured in as many different places in the plant, have to meet in a definite place on a split-second schedule. They are pieced together at the rate of a complete unit every 8 sec., repeated accurately 10,000 times in a 24-hr. day.

Springy, flexible steel stampings are automatically made so accurately and so interchangeably that any one piece will match the accompanying frame part perfectly. No interference can ever occur and all holes must line up exactly. This is absolutely essential, for only a fraction of a second is available to put in all the rivets.

Fully automatic production is already common practice in bulk manufacturing. What this company has accomplished shows that the principle can be applied successfully and on a large scale to assembly operations. The technical staff of the company

conceived, designed and developed, as well as supervised, the building and erection of the entire plant. Not only does this apply to the synchronized conveyor movements in all their intricate perfection. It extends even into the manufacturing tools—presses, riveters, small-parts production machines and the rest.

And work on refinements and improvements is continually being carried on, in the interest of saving a few hundredths of a second here, a fraction of a cent there, one of the few remaining manual operations somewhere else, and thus to cut still further the cost of making automobile frames.

## Operating Plant Without Fuel Cost

(Concluded from page 1687)

among the gaseous products thus transformed into useful fuels.

Floating dust after combustion is precipitated by the baffles within the large combustion chamber shown at the right of the grate chamber. This dust is taken out from the bottom of the chamber at intervals, as necessary. Because of the fact that the air passing through this system is preheated, combustion is at an elevated temperature, sometimes going above 2400 deg. Fahr. Thus the hot gases will form very effective heating media for the boiler operation for which the entire system is designed.

### Estimates of Dollar Value

Calculations have been made looking to the application of this system of incinerator use in a plant employing about 1800 workers in a city of nearly 200,000 population. It has been estimated that the fuel saving here—taking account of maintenance, depreciation and interest charges on the incinerator system—would be of the order of \$125,000 a year. Another plant employing nearly 1200 people in a city of about 100,000 population estimates a saving of \$50,000 a year net.

The magnitude of the benefit to be expected in any given case depends upon a number of factors, such as cost of fuel now used, character and volume of the refuse to be expected daily and the extent to which fuel is needed for power and processing purposes. Similar variations would appear in the return on the investment. It has been estimated that the savings would pay for the average incinerator plant in from three to four years.

Business and industrial leaders will gather at St. Johnsbury, Vt., on July 4 for a three-day celebration in memory of Thaddeus Fairbanks, "father of modern weighing," who invented the platform scale 100 years ago. Former President and Mrs. Calvin Coolidge will be guests of honor at the celebration.

# Machinery Exports Continue Large

Largest Volume for Any Four Months—Agricultural Implements  
Maintain High Total, Though Less Than in March

WASHINGTON, May 29.—Showing a decline of \$4,896,387, exports of American machinery in April were valued at \$51,192,831, against \$56,089,218 in March. For the four months ended April 30, the total value was \$221,254,148, compared with \$207,912,129 last year, an increase of \$13,332,019. In April of last year machinery exports were valued at \$51,238,737. The four-month total was much the highest ever reached, and never before have four consecutive months all been above \$50,000,000.

Due principally to the sharp drop in exports of motor vehicles, exports of all machinery and vehicles declined to a value of \$90,797,286 in April, from \$97,508,210 in March and \$119,-

333,856 in April of last year. In the four months ended with April they decreased to \$368,619,281, from \$470,948,537 in the corresponding period of 1929.

Exports of agricultural machinery and implements in April dropped to a value of \$11,964,000 from \$15,277,000 in March, but in the four months ended with April they reached \$61,595,000, against \$48,830,000 last year.

Total imports of machinery and vehicles in April totaled \$4,018,652, against \$3,642,571 in March and \$3,951,003 in April of last year. In the first four months they were valued at \$14,225,691, compared with \$14,088,446 last year. Listed in THE IRON AGE table are imports valued at

\$3,233,539 in April, compared with \$2,923,498 in March.

The Aeronautics Branch of the Department of Commerce has just published a revision of its standard Aeronautics Bulletin No. 5, entitled "Airports and Landing Fields," which lists nearly 1600 municipal, commercial, and private airports; Army and Navy airdromes and air stations; Department of Commerce intermediate landing fields, and also marked auxiliary fields. Copies of the bulletin may be obtained free of charge upon request, from the Aeronautics Branch, Department of Commerce, Washington, D. C.

## Machinery Exports from the United States

(By Value in Thousands of Dollars)

	April		Four Months Ended April	
	1930	1929	1930	1929
Locomotives .....	\$39	\$21	\$285	\$667
Other steam engines.....	49	86	184	310
Boilers .....	158	127	585	616
Accessories and parts.....	56	36	227	305
Automobile engines.....	825	1,579	3,607	5,596
Other internal combustion engines .....	973	1,074	3,379	3,773
Accessories and parts.....	347	440	1,372	1,587
Electric locomotives.....	52	48	226	359
Other electric machinery and apparatus.....	742	1,554	3,666	4,883
Excavating machinery.....	1,250	1,146	5,171	3,417
Concrete mixers.....	121	123	400	535
Road-making machinery..	565	329	1,528	1,000
Elevators and elevator machinery .....	625	447	2,233	1,792
Mining and quarrying machinery .....	1,514	1,319	6,242	5,446
Oil-well machinery.....	2,729	3,117	10,748	9,057
Pumps .....	709	854	3,530	4,361
Sheet and plate metal-working machines.....	637	391	1,778	1,148
Forging machinery.....	79	141	318	510
Machine tools.....	3,344	1,521	9,086	6,617
Other metal-working machinery and parts.....	668	653	2,547	2,555
Textile machinery.....	737	989	3,448	4,844
Sewing machines.....	738	661	2,890	3,533
Shoe machinery.....	178	161	620	759
Flour-mill and gristmill machinery .....	58	28	159	207
Sugar-mill machinery.....	197	287	601	872
Paper and pulp-mill machinery .....	194	275	983	949
Sawmill machinery.....	57	116	340	328
Other woodworking machinery .....	134	221	630	760
Refrigerating and ice-making machinery .....	426	402	1,140	1,714
Air compressors.....	711	657	2,411	2,666
Typewriters .....	1,645	1,935	7,344	8,384
Power laundry machinery	150	186	624	683
Typesetting machines.....	417	397	1,484	2,157
Printing presses.....	671	489	1,976	2,406
Agricultural machinery and implements .....	11,964	12,031	61,595	48,830
All other machinery and parts .....	17,434	17,498	77,897	74,306
Total .....	\$51,193	\$51,239	\$221,254	\$207,912

\*Principal items detailed in another table.

## Imports of Machinery into the United States

(By Value)

	April		Four Months Ended April	
	1930	1929	1930	1929
Metal-working machine tools..	\$63,691	\$108,446	\$385,438	\$426,824
Agricultural machinery and implements .....	1,809,627	1,177,976	5,860,734	3,544,596
Electrical machinery and apparatus .....	168,860	184,642	599,098	754,773
Other power-generating machinery .....	71,425	62,815	173,642	340,103
Other machinery.....	878,637	998,379	3,298,816	4,342,836
Vehicles, except agricultural ...	231,299	482,836	825,005	1,622,850
Total .....	\$3,223,539	\$3,015,094	\$11,142,733	\$11,031,982

## Exports of Power-Driven Metal-Working Machinery

	April, 1930		March, 1930	
	No.	Value	No.	Value
Engine lathes.....	103	\$296,584	108	\$227,109
Turret lathes.....	35	117,051	48	179,958
Other lathes.....	58	102,555	81	109,060
Vertical boring mills and chucking machines .....	34	115,267	29	74,002
Thread-cutting and automatic screw machines .....	69	118,423	65	116,762
Knee and column-type milling machines...	35	106,576	32	88,640
Other milling machines .....	75	213,705	45	131,611
Gear-cutting machines	37	89,193	54	54,208
Vertical drilling machines .....	36	74,909	18	34,390
Radial drilling machines .....	20	58,502	23	81,357
Other drilling machines .....	118	93,927	295	143,864
Planers and shapers..	48	146,084	55	213,116
External and cylindrical grinding machines .....	69	162,201	70	165,180
Internal grinding machines .....	22	98,660	62	169,832
Metal-working tool-sharpening machines	131	68,282	134	709,938
Total .....	890	\$1,861,919	1,119	\$2,499,027

# Machinery Markets and News of the Works

## Dullness Pervades Markets

Machine Tool Sales and Inquiries Are at Low Point—  
May Business Below That of April

THE general characteristic of all machine tool markets is dullness. During the past week the low volume of both sales and inquiries has been especially noticeable, due in part, perhaps, to the double holiday at the end of last week.

May business is reported to have been below that of April with most of the leading sellers. There are some exceptions, as, for example, at Chicago, where large orders were recently placed by the Majestic Household Utilities Corporation and the Nash Motors Co.

The outlook for the next two or three months is not regarded as

promising, in view of the fact that so many prospective buyers of shop equipment are awaiting a general upturn in business, which is not likely to come before late summer or early fall.

In spite of the slowness of trade in most sections of the country, there are a few bright spots. The Caterpillar Tractor Co., Peoria, Ill., has begun placing orders for an expansion program. The Tyson Roller Bearing Co., Massillon, Ohio, has bought a number of tools and is expected to buy more for a plant to make anti-friction bearings. Formal orders have been placed at Chicago by the Milwaukee Road for car shop equipment.

## New York

NEW YORK, June 3.—A slackening in the machine tool trade is noticeable both as to inquiries and orders. With most of the local dealers and factory representatives the volume of business done in May was less than that of April. The outlook for the next two or three months is not regarded as especially promising in view of the fact that so many prospective buyers are awaiting an upturn in general business, which is not expected before late summer or early fall.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has approved plans for Brooklyn Technical High School at Fort Greene Place and De Kalb Avenue, largest vocational school ever constructed by city, with facilities for 5000 students, to cost \$5,500,000 with equipment. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect for board.

General Cable Corporation, 420 Lexington Avenue, New York, has asked bids on general contract for two additions to plant of Standard Underground Cable Co., subsidiary, at Perth Amboy, N. J., two stories and basement, 91 x 100 ft., and one story and basement, 56 x 85 ft., to cost over \$90,000 with equipment. R. M. Fraser, company offices at Rome, N. Y., is company architect.

Bendix Aviation Corporation, South Bend, Ind., operating Bendix Brake Co., and other subsidiaries, has arranged for purchase of plant and business of Charles Cory & Son, Inc., 183 Varick Street, New York, manufacturer of marine signaling,

communicating and lighting equipment, and will operate as an affiliated interest. Plant will be continued with A. P. Homer, marine engineer, as head of new division. Bragg-Kliesrath Corporation, Long Island City, vacuum booster automobile brakes, another subsidiary of Bendix organization, has leased new building at Queens Boulevard, Hulst and Van Pelt Streets, 175 x 200 ft., for new service, repair and distributing plant.

Charles Goodman, 375 Fulton Street, Brooklyn, architect, has plans for two-story automobile service, repair and garage building, to cost about \$135,000 with equipment.

Value Toy Corporation, 45 East Seventeenth Street, New York, manufacturer of toys, has leased space in building at 43-45 East Nineteenth Street for expansion.

Hudson Bay Mining & Smelting Co., Ltd., 14 Wall Street, New York, will increase capital from 2,500,000 to 3,000,000 shares of stock, no par value, and issue bonds for \$5,000,000, latter fund to be used for expansion in hydroelectric, mining and metallurgical plant near Island Falls, Canada, work to include installation of power equipment and machinery at copper concentrating mill.

Board of Education, Oceanside School District, Oceanside, N. Y., plans installation of manual training equipment in new high school to cost over \$400,000. F. P. Wiedersum, 104 Rockaway Avenue, Valley Stream, L. I., is architect.

United States Rubber Co., Broadway and Fifty-eighth Street, New York, has superstructure under way for six-story addition, 100 x 175 ft., to plant at Passaic, N. J., for which general contract recently was let to John W. Ferguson Co., 152

Market Street, Paterson, N. J., to cost over \$1,000,000 with machinery. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Dry Ice Corporation of America, Inc., 52 Vanderbilt Avenue, New York, has arranged with Continental Oil Co., 50 Broadway, with main offices in Continental Oil Building, Denver, for construction of plant for carbon dioxide production for refrigerating service at oil and gas properties of Continental company at Walden, Colo., to cost over \$300,000 with machinery. It is proposed to organize joint company to operate plant when completed.

J. Forst, Inc., Kingston, N. Y., meat packer, has plans for new two-story plant, to cost about \$140,000 with conveying, refrigerating and other mechanical equipment. O. S. Schlich, 136 Liberty Street, New York, is engineer.

Casper Oil Corporation, 1819 Broadway, New York, operating an oil blending and treating plant at Bayway, Elizabeth, N. J., has leased building at Jersey City, N. J., and will remodel for new plant, including packing and distributing facilities. Bayway works will be removed to new location.

Public Service Corporation of New Jersey, Terminal Building, Newark, is disposing of a preferred stock issue to total about \$14,625,000, part of proceeds to be used for expansion and improvements in power plants and system.

Interests connected with Thomas A. Edison, Inc., West Orange, N. J., manufacturer of electric storage batteries, talking machines, etc., have organized Dictation Machine Ediphone Corporation, with capital of \$125,000, to operate a division for manufacture of sound reproducing and recording machines, parts, etc.

North Jersey Service Corporation, Teaneck, N. J., has asked bids on general contract for two-story automobile service, repair and garage building to cost over \$100,000. P. J. Jossier, 240 Broad Street, Palisades Park, N. J., is architect.

National-Harris Wire Co., 195 Verona Avenue, Newark, manufacturer of fine wires, alloy wires, etc., has acquired Earl Mfg. Co., Chicago, manufacturer of kindred products, and will operate as Middle West division for manufacture and sale of products. A. J. Benson will be in charge of Earl division.

Mongiello Brothers, 451 Communipaw Avenue, Jersey City, N. J., have plans for a one-story ice-manufacturing plant, 100 x 100 ft., to cost over \$65,000 with equipment. Christian H. Ziegler, 26 Journal Square, is architect.

## New England

BOSTON, June 2.—New England industries which have been negotiating with machine tool dealers and manufacturers for equipment are still withholding purchases. Numerous plants took advantage of the holiday last week to remain closed from Thursday evening until this

morning. The General Electric Co. has announced that until Aug. 30 its Lynn River works and Pittsfield plants will be operated on a five-day week schedule. Despite the lack of orders, machine tool dealers believe that equipment buying will start before long.

Lexington Coal Co., Lexington, Mass., will build a coal pocket and purchase conveying equipment.

Nathan Klickstein, 23 Auburn Street, Malden, Mass., will erect a one-story repair shop, 30 x 60 ft.

City of Woonsocket, R. I., is considering plans for a mechanical shop for its water department.

City of Mansfield, Conn., has closed bids on a group of one-story training school units, 75 x 129 ft., 53 x 139 ft., 97 x 165 ft., and 97 x 165 ft.

Walworth Mfg. Co., Boston, has started work on a one-story pipe shop, 80 x 100 ft., to cost \$15,000 without equipment.

Naugatuck Crucible Iron Co., Naugatuck, Conn., has acquired Chicago Crucible Iron Co., Chicago, and will operate both plants under name of Naugatuck-Chicago Crucible Iron Co. New equipment will be installed.

Winsted Insulated Wire Co., Winsted, Conn., will increase its capitalization from \$100,000 to \$200,000, to provide funds for expansion, including a new manufacturing unit and wire drawing machinery.

White Mountain Freezer Co., Nashua, N. H., whose plant was recently burned, has purchased foundry formerly owned by National Bread Wrapping Co. of that city.

Hartford Special Machine Co., Homestead Avenue, Hartford, Conn., has plans for a two-story and basement addition, to cost over \$40,000 with equipment. Greenwood & Noerr, 525 Main Street, are architects and engineers.

J. P. Curry Mfg. Co., Pacific Street, Stamford, Conn., manufacturer of wire bag fasteners and other metal goods, plans rebuilding part of plant recently destroyed by fire, with loss estimated at \$45,000 including equipment.

Cities Service Refining Co., 345 Quincy Avenue, Braintree, Mass., has awarded general contract to Clark & Smith, Inc., 13 Temple Street, for new one-story plant unit for oil compounding and blending, to cost over \$35,000 with equipment. A. J. Mott is chief engineer.

Town Council, Winchester, Mass., has authorized purchase of site near Mystic Valley Parkway and preparation of plans for a new junior high school, to include manual training department. An appropriation of \$390,000 has been approved for project.

Boston Concrete Corporation, a subsidiary of Boston Sand & Gravel Co., 88 Broad Street, Boston, is carrying out an expansion program at Cambridge, Mass., for production and distribution of ready-mix concrete, to cost about \$70,000 with equipment.

Crocker, Burbank & Co., Westminster Street, Fitchburg, Mass., manufacturers of paper products, bristol board, etc., have awarded general contract to Wiley & Foss, Central Street, for an addition and improvements in present plant, to cost about \$90,000 with equipment. George F. Hardy, 309 Broadway, New York, is consulting engineer.

General Conveyors, Ltd., a subsidiary of American Pneumatic Service Co., 213 Congress Street, Boston, manufacturer of conveying systems and equipment, has acquired a factory at Joliette, Quebec, and plans early operation.

Bristol Co., Waterbury, Conn., manu-

## The Crane Market

**I**NQUIRY for electric overhead cranes is quite limited, but some good business is in prospect, such as the list of cranes for the 207th Street yards of the new subway in New York. Present activity is confined to bids on single installations.

Locomotive crane business is also small. The Ford Motor Co. recently closed on two locomotive cranes for a new assembly plant at Edgewater, N. J., and the Bethlehem Steel Co. has purchased a shipyard crane for the Atlantic Works.

Manufacturer of safety hollow set screws and socket head cap screws, has been granted a manufacturing and selling license by Dardelet Threadlock Corporation under its patents for self-locking screw threads.

## South Atlantic

**B**ALTIMORE, June 2.—O. J. Maigne Co., 356 Pearl Street, New York, manufacturer of printers' rollers and kindred equipment, has plans for a three-story branch plant at Washington, to cost over \$50,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in new two-story baking plant to be constructed by Ort Brothers, Midland, near Lonaconing, Md., to cost about \$90,000. Brazell & Anderson, 309 Fourth Avenue, Pittsburgh, are architects.

City School Commission, Salisbury, Md., has authorized installation of manual training equipment in new high school to cost about \$300,000, for which general contract has just been let to G. C. Cogswell Construction Co., Baltimore. Smith & May, Calvert Building, Baltimore, are architects.

Acme Steel Engineering Co., 917 Howard Street, Baltimore, is planning purchase of an air compressor, electrically-operated welding machine and other equipment.

Quartermaster Depot, Camp Holabird, Baltimore, is asking bids until June 9 for 12 electric drills, 12 air compressors, six hydraulic jacks, 18 battery chargers, 24 bucket pumps, 12 gasoline pumps, and 18 lubricating guns.

R. F. Beresford, 1115 Connecticut Avenue, N. W., Washington, architect, has plans for a one-story automobile repair and machine shop to cost about \$30,000 with tools and equipment.

Twin City Boiler Works, Bristol, Va.-Tenn., operating a structural steel and iron plant, and plate works, has arranged for change of name to Bristol Steel & Iron Works, Inc., at same time increasing capital from \$15,000 to \$200,000 for expansion. J. G. Tilley is president and general manager, and W. L. Griffin, vice-president and superintendent.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Consolidated Engineering Co., Inc., St. Paul and Franklin Streets, Baltimore, for three-story factory branch and distributing plant, 85 x 235 ft., at Baltimore, to cost over \$200,000 with equipment. Local offices are at 714 East Pratt Street.

Georgia Power Co., Atlanta, Ga., has purchased Baker County Power Co., Camilla, Ga., and vicinity, for cash price of \$950,000, heretofore owned by W. B. Foshay Co., Minneapolis, now in receivership. New owner will consolidate

properties and plans expansion and betterments in district noted, including transmission lines.

Gastonia Roller, Flyer & Spindle Co., Gastonia, N. C., has been organized to take over and consolidate Lowry Brothers Textile Machine Works, with local plant at 1337 West Second Street, and Textile Spindle & Flyer Co., 501 West Palmer Street, Charlotte, N. C. New organization plans enlarged output, and will also specialize in repair of textile mill machinery, including steel rollers, spindles, etc.

Atmospheric Nitrogen Co., Hopewell, Va., has work under way on addition to nitrogen recovery plant to cost over \$10,000,000 with machinery. Work is scheduled for completion in 18 months, and will be carried out under direction of Stone & Webster Engineering Corporation, engineer and contractor, 120 Broadway, New York, and Boston.

Department of Commerce, Washington, will receive bids until June 13 for 100 engine-generator plants and 150 water tanks.

## Philadelphia

**P**HILADELPHIA, June 2.—With signing of ordinance authorizing purchase of Hog Island shipyard from Government for \$3,000,000, Department of Public Works, Philadelphia, will proceed with plans for municipal airport and improvement of land, and will soon call for bids for initial work. Part of site will be developed for a seaplane base, with hangars, shops and other buildings. Entire project will cost about \$6,600,000. Alexander Murdoch is director of public works.

Electrolux, Inc., 1700 Walnut Street, Philadelphia, manufacturer of electrical appliances and equipment, has leased space in building at Broad and Vine Streets, for factory and sales branch, with storage and distributing facilities.

Board of Education, Lawrence Township, Trenton, N. J., is considering installation of manual training equipment in new two-story high school at Lawrenceville, to cost \$300,000. P. L. Fowler Co., 224 East Hanover Street, Trenton, is architect.

Board of Mercer County Freeholders, Court House, Trenton, N. J., is asking bids until June 10 for plant for mixing road repair materials, including pit hopper with reciprocating feeder, elevator, mixing machinery, pump, motors, storage bin, and auxiliary equipment. Arthur Bray is director of department of road repair.

RCA-Victor Co., Woolworth Building, New York, manufacturer of talking machines and equipment, with main plant at Camden, N. J., has acquired property at Collingswood, N. J., for a new television experimental and radio broadcasting laboratory, including power machinery. W. G. R. Baker is vice-president, in charge of engineering.

Neidlich Process Co., St. Mary Street, Burlington, N. J., manufacturer of processed paper goods, etc., has awarded general contract to Karno-Smith Construction Co., Broad Street Bank Building, Philadelphia, for extensions and improvements in factory, including top addition to present building, to cost about \$75,000 with equipment. Lockwood Greene Engineers, Inc., 140 West Forty-second Street, New York, is architect and engineer.

Board of City Commissioners, Trenton, N. J., is planning electrification of

municipal pumping station used for waterworks. Commissioner Abram Swan, Jr., is in charge.

## Pittsburgh

**P**ITTSBURGH, June 2.—The machinery business in this district, which was given some impetus week before last by the placing of a number of tools by the American Bridge Co., has again lapsed into dullness. Business was further slowed up by the week-end holiday. New inquiry is only fair and a considerable amount of business which has been pending for some time now seems farther from actual placing than before.

The year to date compares unfavorably with 1929, business decreases ranging from 20 per cent in the case of some dealers to as much as 50 per cent with others. Comparisons with previous years, however, are not so discouraging. The absence of railroad buying has been an unfavorable factor this year, although the carriers are expected to show more interest in their tool requirements following the equipment builders' exhibit at Atlantic City this month.

City Council, Erie, Pa., plans installation of municipal incinerating plant, to cost \$150,000 with conveying, elevating, loading and other mechanical equipment, for which a bond issue of \$150,000 has been authorized.

Officials of Fokker Aircraft Corporation of America, Inc., Glendale, W. Va., have organized General Aviation Corporation, capitalized at 5,000,000 shares of stock, no par value, to take over and expand present organization. Increase in production will be arranged, as well as acquisition of other aircraft interests to be operated as individual units. Among these will be Dornier Co. of America, Inc., now controlled by General Motors Corporation, Detroit, and which will soon establish a plant for manufacture of flying boats under Dornier German patents. General Motors Corporation will be largely interested in General Aviation Corporation. Harris M. Hanshue, president Fokker company, is expected to head new organization.

Greyhound Lines, Inc., 1010 Liberty Avenue, Pittsburgh, operating Greyhound-Yelloway bus lines, has filed plans for motor bus service, repair and garage building to occupy entire block, to cost over \$200,000 with equipment.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, is asking bids until June 18 for six motor-driven centrifugal pumping units, with accessories, for installation in Brilliant pumping station. C. W. Lepper is general purchasing agent.

Electro Metallurgical Development Co., Boncar, W. Va., operated by Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, is considering new steam-operated electric power plant to cost over \$150,000 with equipment.

United Carbon Co., Union Trust Building, Charleston, W. Va., is considering installation of a series of control laboratories at natural gas properties in Louisiana and Texas, entire program to cost over \$100,000 with equipment.

## Buffalo

**B**UFFALO, June 2.—P. B. & H. Moulding Co., 411 Canal Street, Syracuse, N. Y., manufacturer of metal moldings and kindred products, has awarded gen-

eral contract to J. C. Williams, 140 Hope Avenue, for new two-story plant, to cost about \$40,000 with equipment. Company recently acquired three-story factory of U. S. Hoffman Machinery Co., Temple Street, manufacturer of clothes-pressing machines for expansion.

Niagara Falls Smelting & Refining Co., 2208 Elmwood Avenue, Buffalo, manufacturer of brass, bronze and nickel alloys, etc., will purchase local plant and business of Orco Mfg. Co., 73 Forest Avenue, manufacturer of controller devices for electric cars, trucks, tractors, etc., and will operate as a unit of organization. Company has also recently purchased plant and business of Eureka Copper Products Co., North East, Pa., manufacturer of brass and copper stampings, forgings, etc., and will develop as a main production unit. Present plant of Orco company will be removed to Eureka works, North East, where expansion will be carried out. Robert E. Molley, vice-president, and heretofore works manager at Niagara plant, will be general manager in charge of operations at North East works. Ernest G. Jarvis is president.

Department of Public Works, Municipal Building, Buffalo, will soon take bids on general contract for marine airport, with hangar with repair and reconditioning facilities and other units, estimated to cost close to \$275,000 with equipment.

Hauser Refrigerating & Equipment Co., Inc., Rochester, N. Y., has been organized by Walter E. and Earl Hauser to take over and expand company of same name with plant at 117 Platt Street, manufacturer of refrigerating equipment. Company is associated with J. Hauser Machine Co., which operates plant at same location.

Officials of St. Regis Paper Co., Watertown, N. Y., have organized Pacific Pulp Mills Corporation, a subsidiary, to manufacture kraft pulp products. New company will take over former mill of Union Bag & Paper Corporation at Tacoma, Wash., as initial works. Expansion in production is planned. Output will be utilized by parent company at mills in New York.

Landon Radiator Co., North Tonawanda, N. Y., has filed notice of company dissolution under State laws.

## Detroit

**D**ETROIT, June 2.—Brunswick-Balke-Collender Co., Muskegon, manufacturer of talking machines, radio equipment, billiard tables, etc., has awarded a general contract to Muskegon Construction Co., Lyman Building, for one and five-story addition, to cost about \$100,000 with equipment.

Municipal Light Department, Detroit, has plans for new power substation, to cost about \$100,000 with machinery. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Board of Education, Benton Harbor, is considering installation of manual training equipment in three-story addition to junior high school, to cost about \$175,000. W. S. Holmes Co., Capitol Savings & Loan Building, Lansing, is architect.

Consumers Power Co., Jackson, is negotiating for purchase of municipal light and power plant at Grand Rapids, for price of \$900,000, and agrees to expend at least \$100,000 for extensions and improvements, including additional equipment.

Cliffs Power & Light Co., Ishpeming, has begun construction of a concrete power dam on Au Train River, about 13 miles

from Munising, for hydroelectric power development, to cost over \$300,000 with transmission lines.

Pattern Products Mfg. Co., 406 West Jefferson Street, Detroit, manufacturer of metal and wood patterns, etc., has awarded general contract to Rutherford-Sickler Co., Detroit, for one-story plant, to cost about \$40,000 with equipment.

City Council, Portland, Mich., has engaged Holland, Ackerman & Holland, Ann Arbor, engineers, to prepare plans for extensions and improvements in municipal electric light and power plant, including additional equipment, to cost about \$60,000.

Lenert Aircraft Corporation, Pentwater, manufacturer of airplanes and parts, has arranged for increase in capital from \$50,000 to \$100,000 for general expansion.

Luce Furniture Co., Grand Rapids, plans rebuilding part of factory recently damaged by storm, with loss reported over \$200,000. Plant of Sligh Furniture Co., damaged in same storm, with loss of \$150,000, will also be rebuilt.

## Cleveland

**C**LEVELAND, June 2.—The machinery market showed a little more activity the past week than earlier in the month. Dealers made quite a few sales, but with one or two exceptions they were for single machines. The Tyson Roller Bearing Co., Massillon, Ohio, bought several standard tools. This company will equip a plant for the manufacture of anti-friction bearings and is expected to make additional purchases. The city of Cleveland took bids today for a 14-in. x 6-ft. lathe for the Fairmount pumping station. Sales by most dealers during May were slightly better than in April. However, with little business in prospect the outlook for this month is not very promising.

Newman Mfg. Co., 1293 West Ninth Street, Cleveland, manufacturer of ornamental brass and bronze products, has awarded general contract to C. O. Johnson, 1139 Oxford Road, for extensions and improvements to cost about \$50,000.

City Council, Minerva, Ohio, has approved plans for an addition to municipal electric light and power plant and installation of equipment.

Standard Oil Co., East Ohio Gas Building, Cleveland, will soon take bids on general contract for new distillation plant, to cost about \$85,000 with equipment. Company engineering department is in charge.

Toledo Scale Co., Toledo, Ohio, has plans for new multi-story plant on site recently acquired near Terminal Railway, to cost over \$1,000,000 with machinery. General contract has been let to A. Bentley & Sons Co., Toledo, for initial unit. New plant will be used also by Toledo Precision Devices, Inc., a subsidiary.

Ice & Fuel Co., 1421 West Federal Street, Youngstown, has plans for a new ice-manufacturing plant, to cost about \$150,000 with equipment. G. B. Bright, 2615 Twelfth Street, Detroit, is architect.

## Milwaukee

**M**ILWAUKEE, June 2.—While considerable industrial construction is under way or about to be undertaken, new projects are limited. Current business is restricted mainly to urgent replacement

needs. Most shops report May bookings as somewhat smaller than April. The active state of inquiry forecasts a moderate June volume, and a revival in automotive demand is expected to enliven business by midsummer.

J. I. Case Co., Racine, Wis., manufacturer of tractors, threshing machines and other farm machinery, has plans by Frank J. Hoffman, architect, Janes Block, Racine, for a one-story Canadian branch warehouse and service station, 130 x 300 ft., at Saskatoon, Sask., to cost about \$100,000 complete.

Van Brunt Mfg. Co., Horicon, Wis., manufacturer of seeding machines, grain drills and other farm equipment, has broken ground for a one-story shop extension, 87 x 120 ft. With equipment it will cost about \$50,000.

Northwestern Electrotpe Co., Hewitt Street, Neenah, Wis., is taking bids for a branch plant, 45 x 100 ft., part two stories, at Menasha, Wis. Plans are by Auler, Jensen & Brown, architects, Oshkosh, Wis.

Milwaukee Department of Public Works, City Hall, is preparing call for bids for installation of new 1,500,000-gal. steel water storage tank at Martin Drive and McKinley Avenue, to cost about \$125,000. H. P. Bohmann is superintendent of water department.

Bucyrus-Erie Co., South Milwaukee, Wis., has started work on new chemical and physical laboratory costing about \$50,000; upon completion present laboratory area will be added to machine shop.

Common Council, Racine, Wis., has authorized appropriation to cover cost of plans and specifications for proposed \$1,700,000 municipal sewage disposal plant, to be built in 1930-1931. J. W. Beaugrand is city engineer.

Nordberg Mfg. Co., East Oklahoma and Chase Avenues, Milwaukee, manufacturer of Corliss and Diesel engines, mining machinery, etc., has plans by Frank D. Chase, Inc., architect and engineer, Chicago, for an erecting shop extension, 80 x 100 ft., costing about \$50,000. Edwin C. Bayerlein is vice-president and general manager.

Gordon & Bulot, consulting engineers, 53 West Jackson Boulevard, Chicago, have plans for waterworks improvements for city of Oconto, Wis., costing about \$40,000. New deep well pumps with electric drive and automatic control, stand-pipe, etc., are included. P. T. Meeuwssen is city clerk.

## Indiana

**I**NDIANAPOLIS, June 2.—Cleveland, Cincinnati, Chicago & St. Louis Railroad Co. (Big Four System), Big Four Building, Cincinnati, has plans for an engine terminal at repair shops at Beech Grove, Ind., consisting of group of one-story units, to cost close to \$1,000,000 with equipment. H. A. Aldrich is architect and H. A. Baldwin, chief engineer, address noted.

Following recent removal of plant from 1914 Singleton Street to larger quarters at Martindale Avenue and Twenty-first Street, Emerson-Scheuring Tank Co., Indianapolis, is carrying out expansion program. Work will include installation of new forge equipment, with several heating furnaces, bulldozer, hydraulic press and other tools for head flanging and similar production not previously handled. Emerson-Scheuring Water Softener Co., an affiliated organization, will also be operated from new location.

Miller Cleaning Machinery Corporation, Clinton, recently organized by Morton G. and Frank R. Miller, plans operation of local plant for manufacture of vacuum cleaning machines and devices. Thomas I. Foster, Clinton, is also interested in organization.

Indianapolis Water Co., 113 Monument Circle, Indianapolis, has arranged for financing in amount of \$1,066,000, part of fund to be used for extensions and betterments in pumping plants and other mechanical divisions and system.

Lynch Corporation, Anderson, has been organized to take over and succeed to Lynch Glass Machine Co., operating a local plant for manufacture of glass-making machinery and parts. Increased production will be carried out. Company is headed by T. C. Werbe, V. S. Rice and Edward G. Bridges.

Board of Education, Hobart, is considering installation of manual training equipment in new two-story high school to cost about \$200,000, for which plans are being drawn by Buckley, Skidmore & Wainwright, 611 Homan Street, Hammond, architects.

## Chicago

**C**HICAGO, June 2.—The local machine tool market continues somewhat erratic. Formal orders placed by the Milwaukee Road for car shop equipment bolstered the books of some dealers as May ended. The Majestic Household Utilities Corporation, Chicago, has closed for a few tool room machines and the Museum of Science and Industry, Chicago, has ordered several precision tools for a maintenance shop. Caterpillar Tractor Co., Peoria, Ill., has started purchasing. This is understood by some in the trade to indicate that buying will be spread and that a list will not be issued. Dealers are expecting inquiries from the A. O. Smith Corporation, Milwaukee, which recently awarded a contract for a laboratory and research building.

Aridor Co., 589 East Illinois Street, Chicago, manufacturer of metal caps and kindred products, has awarded general contract to Heidel & Beck, 6235 South Michigan Avenue, for one and two-story plant to cost about \$140,000 with equipment. Company recently leased site, 130 x 350 ft., for new unit. Present plant will be removed to new location and capacity increased. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, has approved plans for addition to engine house at Denver, with repair facilities, to cost close to \$50,000 with equipment. Company engineering department is in charge.

Duparquet, Hout & Moneuse Co., 312 West Ontario Street, Chicago, manufacturer of ranges, kitchen utensils, etc., has purchased one-story factory, 123 x 195 ft., at 1215-31 West Fullerton Street, for new plant. Output will be increased.

Montana-Dakota Power Co., 831 Second Avenue, South, Minneapolis, has begun construction of new steam-operated electric generating plant at Williston, N. D., to cost about \$200,000 with machinery.

Board of Education, Algona, Iowa, is considering installation of manual training equipment in new two-story central senior and junior high school to cost about \$200,000, for which bids will soon be asked on general contract. Proudfoot, Rawson,

Souers & Thomas, Hubbell Building, Des Moines, Iowa, are architects.

Continental Oil Co., Continental Oil Building, Denver, is considering construction of new oil refinery to cost close to \$1,000,000 with machinery and pipe lines.

Mills Novelty Co., 4110 Fullerton Avenue, Chicago, manufacturer of coin-vending machines and parts, has awarded general contract to G. Thomason, 30 North La Salle Street, for a one-story addition, 108 x 117 ft., for tool department, to cost about \$40,000 with equipment.

Cracker Jack Co., Harrison and Peoria Streets, Chicago, plans installation of ovens, power equipment, conveying, automatic handling and wrapping machinery in new three-story candy factory, to cost over \$500,000 with equipment. Nimmons, Carr & Wright, 333 North Michigan Avenue, are architects.

## Cincinnati

**C**INCINNATI, June 2.—Demand for lathes showed some improvement during May, but other lines of machine tools, while experiencing occasional spurts in orders, failed to better the April volume. Inquiry also slackened during the past month, although builders report that requests for quotations continue fair.

Production continues at less than capacity and manufacturers welcomed the holiday last week to close their plants for three days.

Board of Education, Troy, Ohio, is considering installation of manual training equipment in new two-story grade and high school to cost about \$200,000, for which plans are being completed by Pretzinger & Pretzinger, Reibold Building, Dayton, Ohio, architects.

United States Tobacco Co., Eleventh and Harrison Streets, Nashville, Tenn., plans new six-story plant to cost over \$70,000 with equipment, to include mechanical air-conditioning equipment, conveying and other mechanical-handling equipment, etc.

Frigidaire Corporation, Dayton, Ohio, manufacturer of electric refrigerating equipment, a division of General Motors Corporation, is developing a new department of production for gas-operated refrigerators.

Board of Education, Louisville, is planning construction of new trade and vocational school, to be known as Ahrens Trade School, to cost about \$300,000 with equipment.

City Council, Knoxville, Tenn., has awarded general contract to H. E. Rogers, 977 Lee Avenue, for hangar at municipal McGhee-Tyson airport, including repair and reconditioning facilities, to cost about \$30,000 with equipment. Harry Wright is city engineer.

Board of School Commissioners, Glasgow, Ky., plans installation of manual training department in new two-story school to cost \$175,000, for which H. E. Boyle & Co., Furniture Building, Evansville, Ind., are architects.

## Pacific Coast

**S**AN FRANCISCO, May 29.—Pacific Coast Steel Co., 111 Sutter Street, San Francisco, has acquired property on West Third Street and plans construction of four one-story units, totaling about 175,000 sq. ft. floor space, to cost over \$300,-

000 with equipment. Engineering department of company is in charge.

Stephens-Adamson Mfg. Co., 2227 East Thirty-seventh Street, Vernon, Los Angeles, manufacturer of conveying and elevating equipment, has awarded general contract to William P. Nell Co., Inc., 4814 Loma Vista Street, for two-story and basement factory branch and distributing plant, to cost about \$35,000 with equipment.

Borden's Farm Products Co. of California, Inc., 1950 Naomi Avenue, Los Angeles, has plans for a one-story ice-manufacturing and refrigerating plant, 40 x 140 ft., to cost over \$75,000 with machinery. Company engineering department is in charge.

Board of Education, San Diego, Cal., has plans for a one-story vocational shop, 56 x 160 ft., at Herbert Hoover High School, to cost over \$80,000 with equipment. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Crane Co., 160 North Fourteenth Street, Portland, has leased property on Twelfth Street as site for new factory branch, storage and distributing plant, 100 x 200 ft., with pipe-cutting, fitting and other departments, to cost about \$50,000 with equipment. A transfer crane and monorail system will be installed. Drake-Wyman-Voss, Inc., United States Bank Building, is architect and engineer. Company headquarters are at 836 South Michigan Avenue, Chicago.

Sperry Flour Co., Fourth and Berry Streets, San Francisco, has approved plans for a five-story grain and feed milling plant, 96 x 145 ft., at Ogden, Utah, with elevating, screening, cleaning and other mechanical equipment, to cost \$125,000 with machinery. H. P. Iverson is local district manager.

Board of Education, Pomona, Cal., has plans for a one-story vocational shop addition, 57 x 100 ft., at local high school, to cost about \$60,000 with equipment. T. C. Kistner & Co., Architects' Building, Los Angeles, are architects.

Pacific Fruit Express Co., 64 Pine Street, San Francisco, a subsidiary of Southern Pacific Railroad, is considering extensions and improvements in car-icing plant at Pocatello, Idaho, including installation of ice-making and other equipment, to cost about \$70,000

## Gulf States

**B**IRMINGHAM, June 2.—New Orleans Public Service, Inc., 317 Baronne Street, New Orleans, plans expansion and improvements in electric light, power and gas properties, to cost about \$5,000,000.

J. M. Huber Petroleum Co., Borger, Tex., has purchased oil plant and property of Pacific American Gasoline Co., including oil and gas wells in Hutchinson County. Gasoline refinery has a capacity of 15,000 bbl. per day, and will be developed to increased output by new owner.

City Council, Denton, Tex., is planning early call for bids for ice-making machinery to be installed in municipal power plant for city-owned ice-manufacturing plant.

Baton Rouge Parish Police Jury, Baton Rouge, La., is asking bids on general contract until June 10 for group of buildings at municipal airport, including two-story hangar, 100 x 120 ft., with repair and reconditioning facilities, administration building and other units, to cost over \$85,000 with equipment. Jones, Roessle, Olschner & Weiner, Maison Blanche

Building, New Orleans, and Raymond Building, Baton Rouge, are architects.

De Soto Foundry & Machine Co., Mansfield, La., has arranged for increase in capital to \$150,000 for expansion. D. W. Derrick is secretary.

City Commission, Monroe, La., plans installation of manual training equipment in new three-story and basement high school, 75 x 325 ft., with wing-extension, 145 x 250 ft., for which bids are being asked on general contract until June 30. J. W. Smith & Associates, Ouachita National Bank Building, are architects. Estimated cost is \$425,000.

State Highway Department, Austin, Tex., has plans for a one-story equipment storage and distributing plant, 50 x 120 ft., with repair facilities, on State Highway No. 6, near Dallas, to cost over \$40,000 with equipment.

Texas Hydroelectric Corporation, Seguin, Tex., recently organized by E. P. Smith and A. L. Gagnon, Seguin, and associates, has awarded contract to Sumner-Sollitt Co., San Antonio, Tex., for three power dams on Guadalupe River, between Seguin and Gonzales, for hydroelectric power development, to cost over \$1,000,000 with machinery and transmission lines.

Southwest Vocational School, Chamber of Commerce Building, Dallas, Tex., has work under way on initial unit of vocational training school, Oak Cliff section, to cost over \$300,000 with equipment.

Central Power & Light Co., Frost National Bank Building, San Antonio, Tex., has acquired property at Del Rio for new ice-manufacturing plant, to cost about \$40,000 with machinery. Company is now operating two plants of this kind at same place.

Texas & Pacific Railway Co., Dallas, Tex., has superstructure under way on new buildings at car repair shops at Big Spring, Tex., including a one-story machine shop, engine house with repair facilities, one-story boiler and blacksmith shop, equipment storage and distributing building, woodworking building and other mechanical units, to cost about \$400,000 with equipment.

Union Oil Mill, Inc., West Monroe, La., plans addition to cottonseed oil mill for storage and distribution, to cost about \$55,000 with equipment.

## St. Louis

**S**T. LOUIS, June 2.—St. Louis Electric Terminal Railway Co., 3729 North Broadway, St. Louis, a subsidiary of Illinois Terminal Railroad System, 1221 Locust Street, plans installation of conveying, elevating, loading and other mechanical equipment, in new multi-story freight and express terminal, to cost about \$1,400,000. Mauran, Russell & Crowell, Chemical Building, are architects.

Monarch Wrecking Co., 1915 Locust Street, Kansas City, Mo., is planning a one-story machine and equipment shop at North Kansas City, 60 x 185 ft., to cost about \$40,000 with equipment. Claude Jacobs is president.

Missouri-Kansas Pipe Line Co., 10 South La Salle Street, Chicago, has approved plans for pipe line from Panhandle field in Texas to point near Evansville, Ind., by way of Kansas City, Mo., Decatur, Ill., Terre Haute, Ind., and Indianapolis, about 1250 miles, to cost over \$30,000,000 with pumping and booster stations. Company is also said to be

planning pipe line east and west through Missouri, to cost over \$7,000,000. Frank P. Parish is president.

Pallady Welding Co., 415 West Fourth Street, Oklahoma City, Okla., has awarded general contract to Reynolds Construction Co., Franklin Building, for one-story plant, 50 x 100 ft., to cost about \$30,000 with equipment.

Department of Public Works, City Hall, Kansas City, Mo., M. S. Murray, director, plans installation of conveying, elevating, loading and other mechanical-handling equipment in new freight terminal, to cost about \$500,000. W. F. Shulz, Shire Building, Memphis, Tenn., is consulting engineer.

Oil Well Improvement Co., Sand Springs Road, Tulsa, Okla., manufacturer of oil well drilling equipment and kindred machinery, has acquired adjoining property for one-story addition for expansion in foundry and pattern division, to cost about \$40,000 with equipment.

Southwestern Natural Gas Corporation, Quinton, Okla., has plans for a new pipe line to different parts of State, totaling over 100 miles, to cost close to \$1,000,000 with booster stations and auxiliary equipment.

Matafolls, Inc., St. Louis, recently formed by Harry C. Avis, 5142 Waterman Street, and associates, plans operation of local factory for production of tin foil, aluminum foil, sheet metal and other metal specialties.

Board of Education, Seminole, Okla., has plans for a two-story and basement addition to high school, 60 x 135 ft., for a manual training unit, with portion reserved for gymnasium, to cost about \$80,000 with equipment. Hawk & Parr, Hales Building, Oklahoma City, Okla., are architects.

Warson Petroleum Co., Inc., Paul Brown Building, St. Louis, has plans for a one-story storage and distributing plant, 100 x 225 ft., to cost about \$50,000 with equipment.

## Foreign

**P**LANS are under way for organization of new company to take over and operate Hawaii Cellulose, Ltd., Hilo, Hawaii, including more than 20 acres for new plant for production of wallboard, paper pulp and other products, using bagasse, or sugar cane waste, as source of raw material. Initial works will cost over \$500,000 with machinery. New company will be capitalized at \$1,500,000 and will be identified with Theodore H. Davies & Co., Alexander & Baldwin, and Castle & Cook, Honolulu, Hawaii, all representing sugar estates in district noted.

Roan Antelope Copper Mines, Ltd., London, England, is arranging for a new stock issue to total £1,500,000 (about \$7,500,000), and other financing, considerable part of proceeds to be used for expansion and development of copper properties in Northern Rhodesia, Africa, where 19,780 acres has been secured.

Goodyear Tire & Rubber Co., Akron, Ohio, has plans for new plant at Hurlingham, near Buenos Aires, Argentina, where large tract was recently acquired. Initial plant will consist of four mills, with output of about 1000 automobile tires and tubes a day, to cost over \$2,000,000 with machinery. Project will include power house, machine shop and other mechanical units. It is expected to begin work in July. Company engineering department is in charge.

